GATES LEARJET CORPORATION

maintenance manual

CHAPTER

21

AIR CONDITIONING

RECORD OF TEMPORARY REVISIONS

Temp. Rev. No.	Date Inserted	Date Removed	Location	Temp. Rev. No.	Date Inserted	Date Removed	Location
21-1	Mar 17/78	Apr 30/82 Rev 14	21-30-02 Pg 202				
21-2	Mar 17/78	Apr 30/82 Rev 14	21-30-07 Pg 201				
21-3	Jun 30/78	Apr 30/82 Rev 14	21-60-00 Pg 8				
21-4	Nov 8/78	Apr 30/82 Rev 14	21-30-07 Pg 202				
21-5	Mar 7/79	Apr 30/82 Rev 14	21-50-00 Pg 201				
21-6	Sep 10/79	Apr 30/82 Rev 14	21-30-00 Pg 202				
21-7	Jan 18/82	Apr 30/82 Rev 14	21-30-02 Pg 202				
21-8	Aug 21/82	Apr 30/82 Rev 14	21-50-02 Pg 201				

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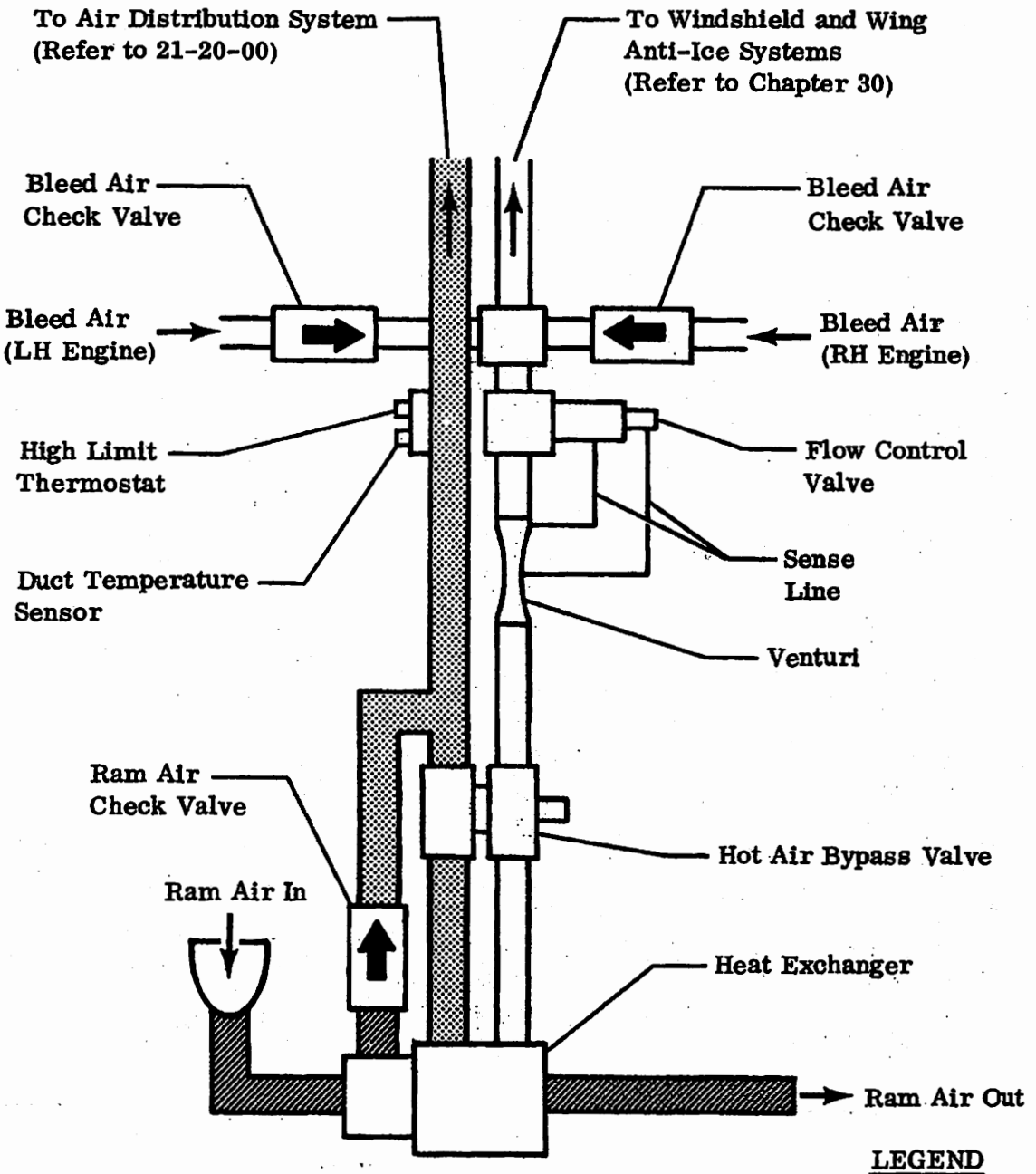
AIR CONDITIONING - DESCRIPTION AND OPERATION

1. Description (See figure 1.)
   A. Engine bleed air is the primary source of cabin air conditioning and pressurization. The engine bleed air is flow controlled, precooled, and ducted into the cabin for air conditioning. Pressurization is accomplished by controlling the amount of air exhausted from the cabin.
   B. A refrigeration (freon) system and an auxiliary cabin heater system supplement the normal air conditioning system. These supplemental systems can be utilized without engine operation using an auxiliary power source.

2. Operation (See figure 1.)
   A. Engine bleed air is admitted through a flow control valve and a venturi to the heat exchanger. The bleed air is precooled in the heat exchanger by ram air entering the dorsal inlet, passing through the heat exchanger, and then dumping into the tailcone.
   B. Precooled engine bleed air is ducted into the cabin area by two air distribution ducts. The ducts, one on the RH side and one on the LH side, incorporate check valves to prevent loss of cabin pressure in the event of an air distribution duct failure.
   C. Cabin pressurization is accomplished by controlling the amount of air that is exhausted from the cabin through the cabin air exhaust control valve or cabin safety valve.
   D. Cabin heating and cooling is accomplished by controlling the amount of bleed air that is allowed to bypass the heat exchanger through the hot air bypass valve.
   E. On Aircraft 25-067, 25-070 thru 25-226, the cabin temperature is maintained by a control circuit which utilizes a temperature-sensitive resistance bridge circuit. The bridge circuit controls a hot air bypass valve (H-valve). On Aircraft 25-227 and Subsequent, the cabin temperature control system is operated by a regulated pressure system. The regulated pressure is used to position the hot air bypass valve (H-valve).
   F. Precooled engine bleed air is utilized to defog the internal surface of the windshield. For further information on the internal defog system, refer to Chapter 30.



NOTE: Refer to Temperature Controls System (21-60-00) for Cabin Temperature Control Schematic.

Air Conditioning System Schematic
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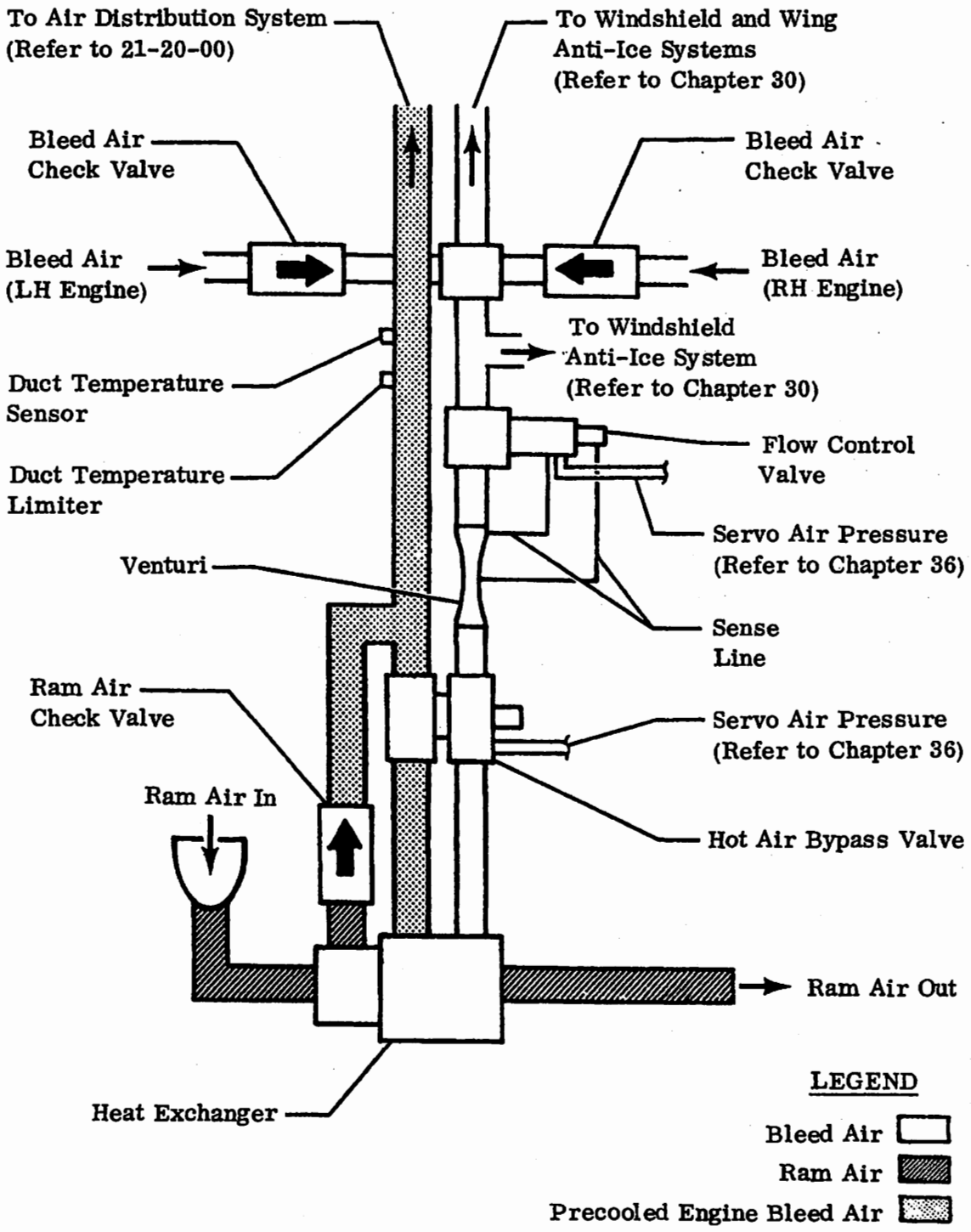

Air Conditioning System Schematic
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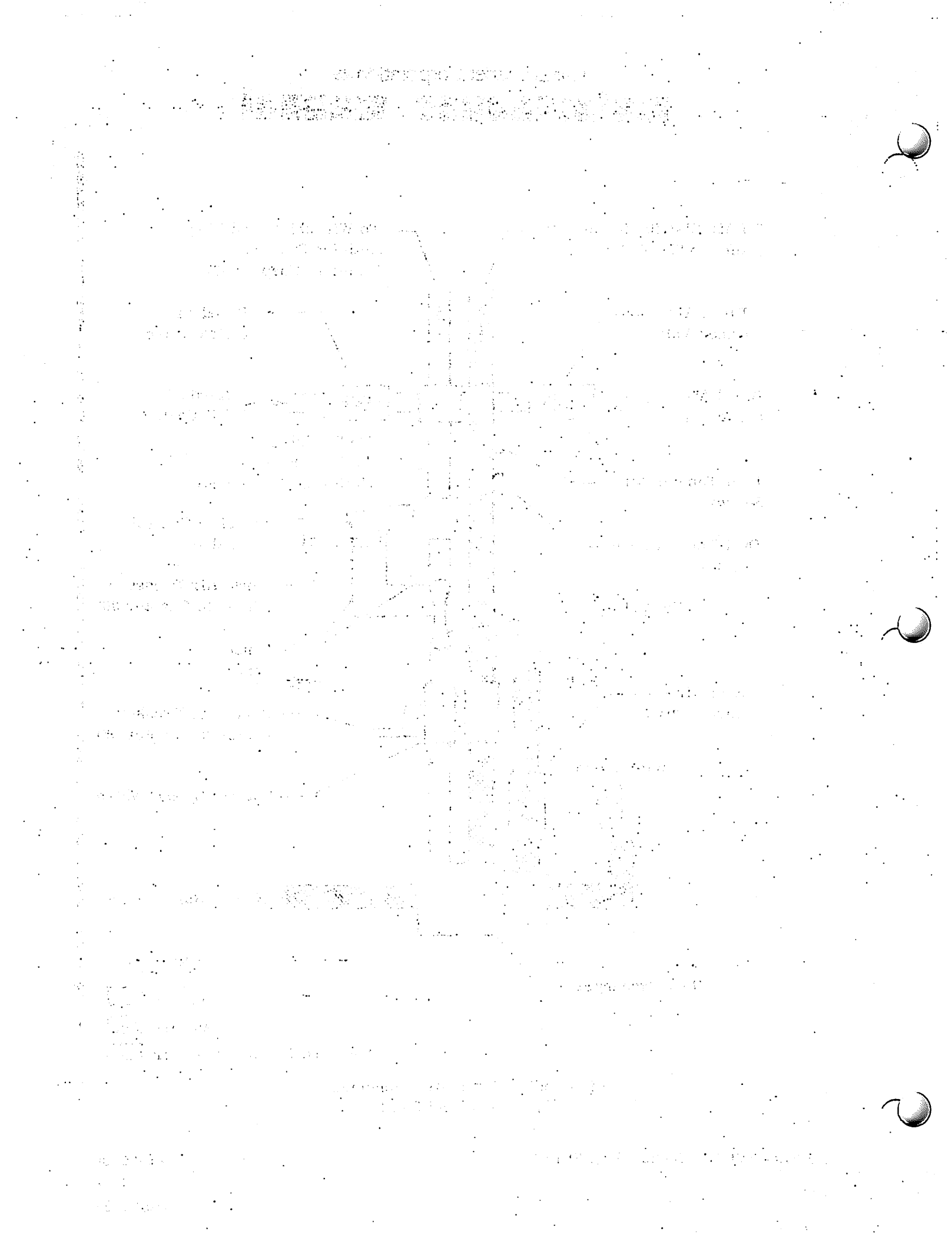
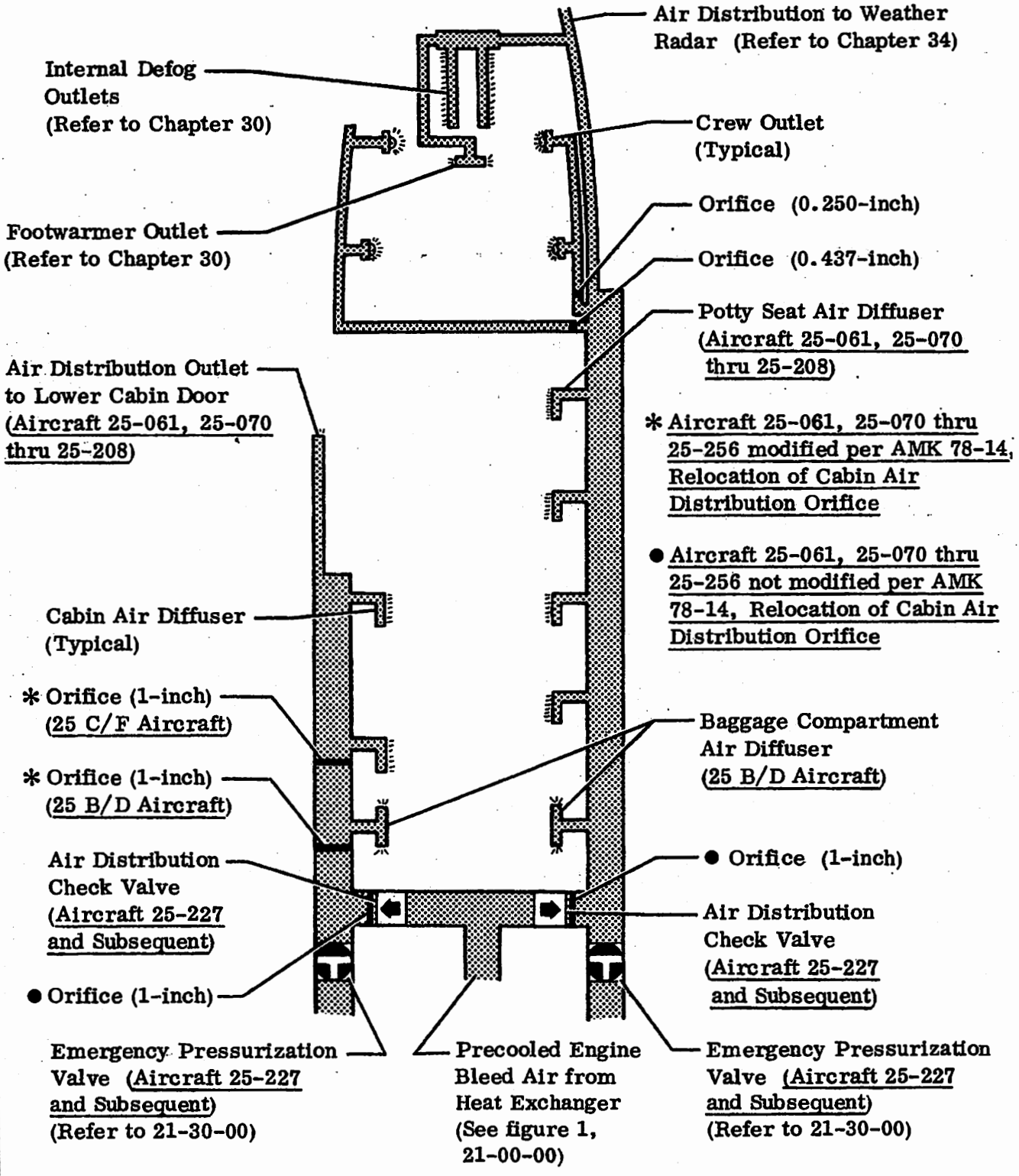


AIR DISTRIBUTION - DESCRIPTION AND OPERATION

1. Description (See figure 1.)
   - A. Precooled engine bleed air is routed into the cabin by two air distribution ducts. One is located on the LH side and one on the RH side. A bleed air check valve is installed in each distribution duct to prevent loss of cabin pressure in the event of an air distribution duct failure in the tailcone.
   - B. Precooled engine bleed air is vented into the cabin through diffusers, into the cockpit through variable opening diffusers, across the internal surface of the windshield and on Aircraft 25-061, 25-070 thru 25-208, into the lower cabin door through a vent opening in the aft side of the door frame.
   - C. On 25 B/D Aircraft additional diffusers are installed in the aft baggage compartment.
   - D. On Aircraft 25-279 and Subsequent a LH seat rail diffuser has been added to help improve cabin airflow.
   - E. Orifices are located in the cabin air distribution system to restrict airflow into the cabin area. On Aircraft 25-061, 25-070 thru 25-256 not modified per AMK 78-14, Relocation of Cabin Air Distribution Orifice, a 1-inch orifice is installed in both the RH and LH cabin air distribution ducts downstream from each air distribution check valve. On Aircraft 25-061, 25-070 thru 25-256 modified per AMK 78-14, Relocation of Cabin Air Distribution Orifice, the RH and LH cabin air distribution duct orifices have been relocated farther upstream in the cabin air distribution ducts to the air distribution check valve coupling. On Aircraft 25-061, 25-070 and Subsequent, there are two orifices installed in the RH air distribution duct as integral parts of the duct assembly. Located between frames 10 and 11, one orifice (0.437-inch) is utilized in the pilot's air distribution outlet, and one orifice (0.250-inch) in the copilot's air distribution outlet.

2. Operation (See figure 1.)
   - A. Precooled engine bleed air flows into the cabin area when the Air Bleed Switch is set to NORM or on Aircraft 25-227 and Subsequent, when the Cabin Air Switch, and the Air Bleed (Bleed Air) Switches are set to ON.



Air Distribution System Schematic
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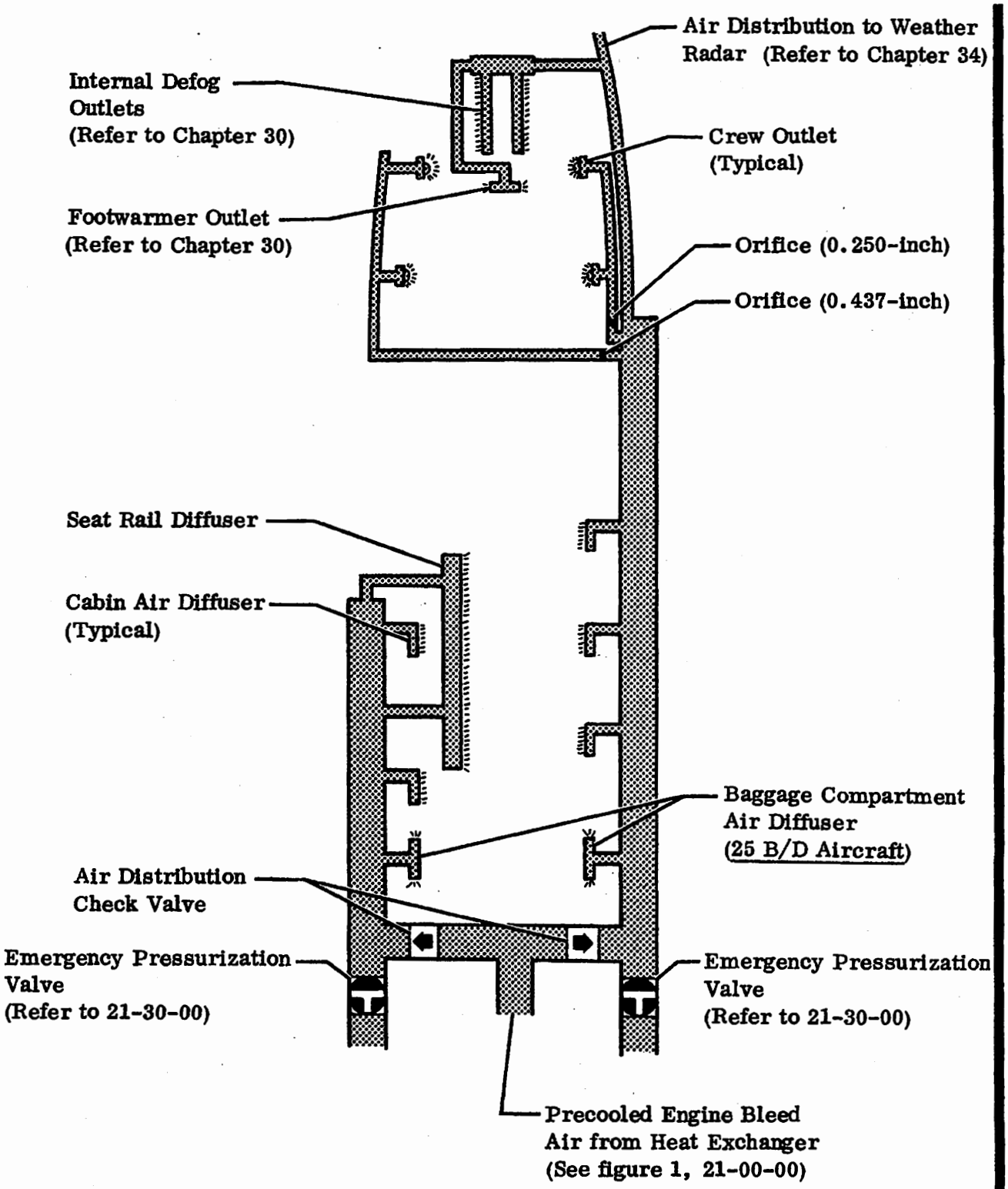


Air Distribution System Schematic
Figure 1 (Sheet 2 of 2)

DISTRIBUTION - TROUBLE SHOOTING

1. Trouble Shooting

NOTE: The following trouble shooting procedures are provided as an aid to detect possible troubles in the air distribution system.
The distribution system utilizes orifices and foam restrictors to balance the cabin air flow. A leak test can be performed by supplying 20 psig minimum airflow from a ground pressure cart to the service port in the tailcone bleed air system.
Any leakage which can be detected by "feel" is not acceptable.

TROUBLE	PROBABLE CAUSE	TROUBLE SHOOTING	REPAIR
1. RH seat locations hot. LH seat locations cool.	1. Obstruction at LH armrest diffuser outlet or LH seat-rail diffuser outlet.	1. Check diffuser outlets for obstructions, interior carpet, etc.	1. Remove obstruction.
	2. Component or connector leakage in RH distribution system.	2. Check lines and connectors for leakage, check RH armrest diffuser for external leakage. Check air distribution check valve as follows: With normal air flow, force the RH distribution duct check valve against its seat. If valve is leaking, there will be a notable noise change.	2. Remove and replace/ repair leaking connectors or components.
	3. Line restrictions in LH distribution system.	3. Remove LH interior and trace air supply lines for kinks or restrictions.	3. Straighten lines and remove restrictions.
	4. Line restriction in RH distribution system downstream of armrest diffuser (in cockpit area).	4. Remove cockpit and fwd potty interior to check for kinks or restrictions in air ducting.	4. Straighten lines, remove restrictions.
	5. Orifice size incorrect.	5. Verify orifice sizes per Figure 1.	5. Correct size of orifices.
2. LH seat locations hot. RH seat locations cool.	1. Obstruction at RH armrest diffuser outlet or RH seat-rail diffuser.	1. Check diffuser outlets for obstructions, interior carpet, etc.	1. Remove obstruction.
	2. Component or connector leakage in LH distribution system.	2. Check lines and connectors for leakage, check RH armrest diffuser for external leakage. Check air distribution check valve as follows: With normal air flow, force the LH distribution duct check valve against its seat. If valve is leaking, there will be a notable noise change.	2. Remove and replace/ repair leaking connectors or components.
	3. Line restrictions in RH distribution system.	3. Remove RH interior and trace air supply lines for kinks or restrictions.	3. Straighten line. Remove restrictions.
	4. Orifice size incorrect.	4. Verify orifice sizes per Figure 1.	4. Correct size of orifices.

TROUBLE	PROBABLE CAUSE	TROUBLE SHOOTING	REPAIR
3. RH or LH cabin floor is cold.	1. Obstructions at seat-rail diffuser outlets.	1. Check outlet of seat-rail diffuser for obstructions, interior carpet, etc.	1. Remove obstruction.
	2. Leaking connector.	2. Check all connections to seat-rail diffuser for leaks.	2. Remove and/or repair connections.
	3. Restrictions in seat-rail diffuser supply hoses.	3. Remove interior to check supply lines for kinks or restrictions.	3. Straighten lines. Remove restrictions.
	4. Insulation between seat-rail diffuser not installed.	4. Remove interior to check for insulation between seat-rail and diffuser .18 thick phenolic strip.	4. Insulate as required.
	5. Orifice size incorrect.	5. Verify orifice sizes per Figure 1.	5. Correct size of orifices.
4. RH or LH floor is hot.	1. Restrictions in armrest diffuser supply or outlets.	1. Remove interior to check for restrictions.	1. Remove restrictions.
	2. Leaks or cracks in seat-rail diffuser or diffuser connectors.	2. Remove carpeting to check for leaks.	2. Repair leaks.
	3. Seat-rail diffuser supply orifice too large.	3. Verify orifice size per Figure 1.	3. Correct size of orifice.
5. Fwd potty area is cold.	1. Obstruction to potty diffuser outlet.	1. Check outlet of diffuser for obstructions, interior carpet, etc.	1. Remove obstruction.
	2. Leaking connectors to potty diffuser.	2. Check connectors for leakage.	2. Remove and/or repair connectors.
	3. Restrictions in potty diffuser supply.	3. Remove interior to trace supply line for kinks or restrictions or excessive foam restriction in diffuser supply tube. (Ref. Figure 1.)	3. Straighten lines. Remove restrictions.
	4. Cold draft from cabin entry door.	4. Inspect door seal and door fit.	4. Repair door and door fit.
	5. Orifice size incorrect.	5. Verify orifice sizes per Figure 1.	5. Correct size of orifices.
6. Fwd potty area hot.	1. Leaking connections to fwd end of armrest diffuser or supply ducting in the potty area.	1. Remove interior to check for leaks or loose connections.	1. Repair leaks.
	2. Foam restrictor to potty diffuser too small.	2. Verify foam installation in potty diffuser per Figure 1.	2. Correct foam installation.
7. Cockpit cold, cabin hot.	1. Restrictions to cockpit air supply lines.	1. Remove interior to trace cockpit air supply lines for kinks or restrictions.	1. Straighten lines. Remove restrictions.
	2. Leaking connections or components in cabin air distribution system.	2. Check lines and connectors for leakage, check diffusers for external leakage. Check air distribution check valves as follows: With normal air flow, force the distribution check valves against their seat. If valves are leaking, there will be a notable noise change.	2. Remove and replace or repair leaking connectors or components.

TROUBLE	PROBABLE CAUSE	TROUBLE SHOOTING	REPAIR
7. Cockpit cold, cabin hot. (Cont.)	3. Orifice size incorrect.	3. Verify orifice sizes per Figure 1.	3. Correct size of orifice.
8. Cockpit hot, cabin cold.	1. Leaks in cockpit air distribution ducting and connectors.	1. Remove interior to check for leaks in the cockpit area.	1. Repair leaks.
	2. Restrictions in cabin air distribution ducting.	2. Remove interior to check for restrictions in the cabin area.	2. Remove restrictions.
	3. Orifice size incorrect.	3. Verify orifice sizes per Figure 1.	3. Correct size of orifice.
9. Cockpit wemac velocities low.	1. Faulty wemac or wemac connection.	1. Remove interior to inspect wemac body and connection.	1. Remove and/or repair wemac and connection.
	2. Restriction to wemac supply.	2. Remove interior to check supply line for kinks or restrictions.	2. Straighten lines. Remove restriction.
	3. Leaks in cabin air distribution system.	3. Remove interior to check for leaks in the cabin air distribution system.	3. Repair leaks.
	4. Orifice size incorrect.	4. Verify orifice sizes per Figure 1.	4. Correct size of orifices.
	5. Low bleed air supply.	5. Check tailcone ducting connectors for leaks, check flow control valve.	5. Repair leaking connectors or lines. Replace flow control valve.
10. Windshield defog velocities low.	1. Leaking connection to interior defog diffuser.	1. Check connection to diffuser for leaks.	1. Repair connection.
	2. Restrictions in defog diffuser supply line.	2. Trace supply line to defog diffuser for restrictions. Check base of defog tubes for restrictions.	2. Straighten kinked lines. Remove restrictions.
	3. Orifice size incorrect.	3. Verify orifice sizes per Figure 1.	3. Correct size of orifices.
	4. Low bleed air supply.	4. Check tailcone duct connectors for leaks. Check flow control valve.	4. Repair leaking connectors or lines. Replace flow control valve.
11. Air at diffuser outlets too hot.	1. High bleed air supply.	1. Check flow control valve.	1. Replace flow control valve.
	2. Restrictions or leakage in ram air supply to heat exchanger.	2. Check ram air supply ducting for leaks and restrictions.	2. Repair connections. Remove restrictions.
12. Hot spot in cabin.	1. Leaking supply lines or components in vicinity of hot spot.	1. Remove interior near the hot spot to check for leaks.	1. Repair leaks.

AIR DISTRIBUTION - MAINTENANCE PRACTICES

1. Removal/Installation

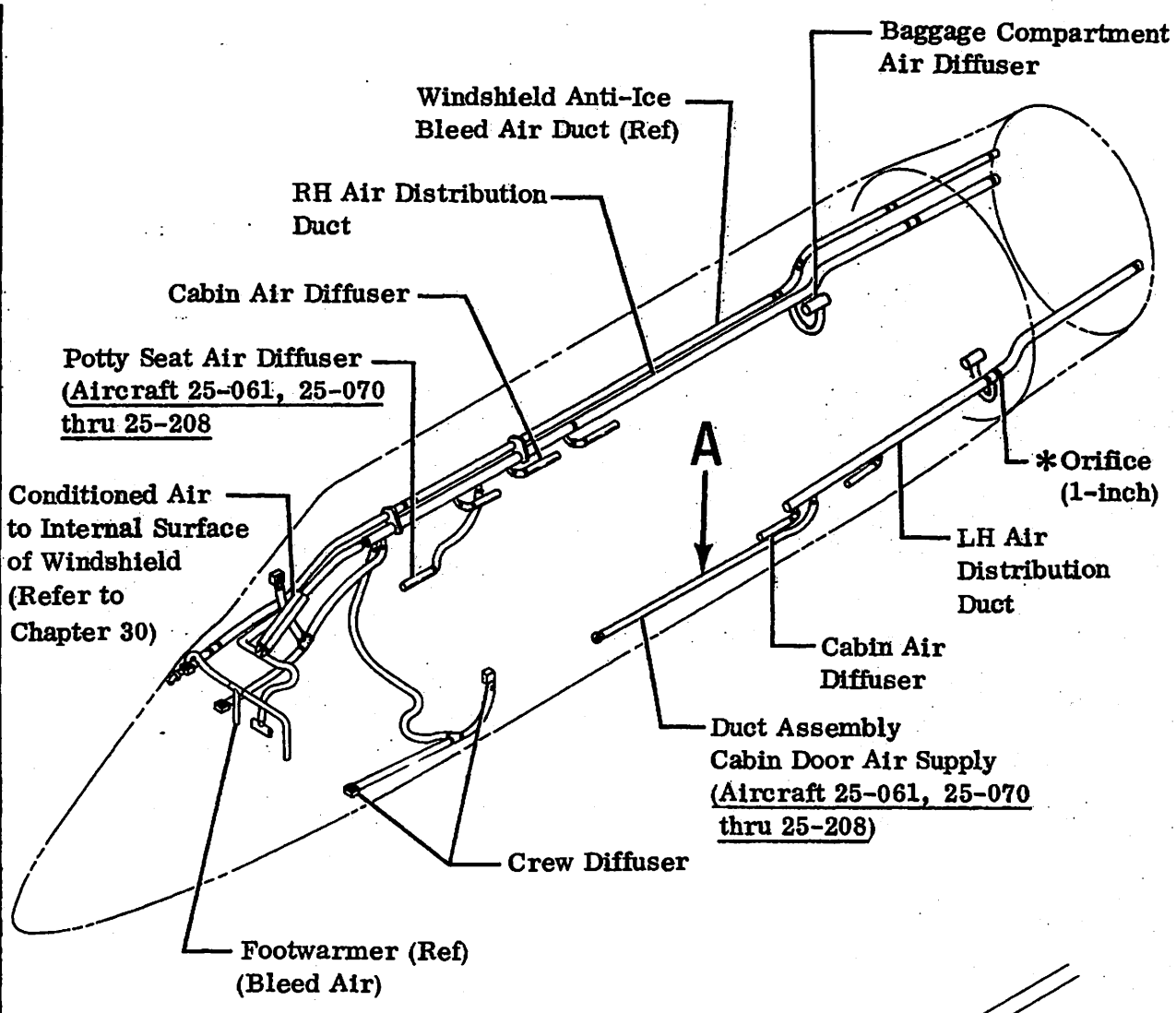
NOTE: The air distribution ducts and diffusers do not require periodic maintenance.

A. Remove Distribution Ducts (See figure 201.)
   (1) Remove equipment and upholstery as required to gain access to distribution ducts.
   (2) Loosen and remove clamps as required to allow removal of distribution ducts.

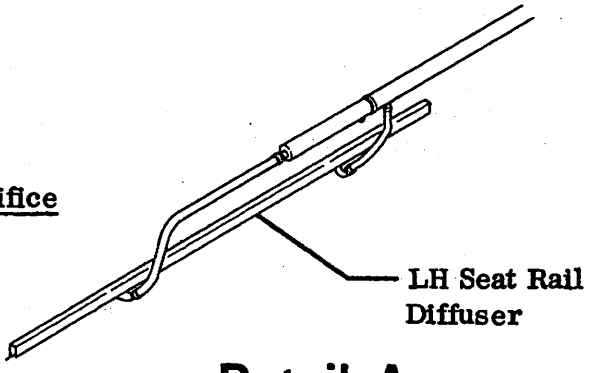
B. Install Distribution Ducts (See figure 201.)
   (1) Install distribution ducts.
   (2) Secure with clamps.

NOTE: Torque T-bolt clamps to 20 inch-pounds plus drag torque. Drag torque is the amount of torque required to overcome the friction of any self-locking nut. This nut friction (drag torque) must be added to the torque callout to assure proper torquing.

   (3) Install previously removed upholstery and equipment.



*Aircraft 25-061 thru 25-256 except when Modified per AMK 78-14, Relocation of Cabin Air Distribution Orifice

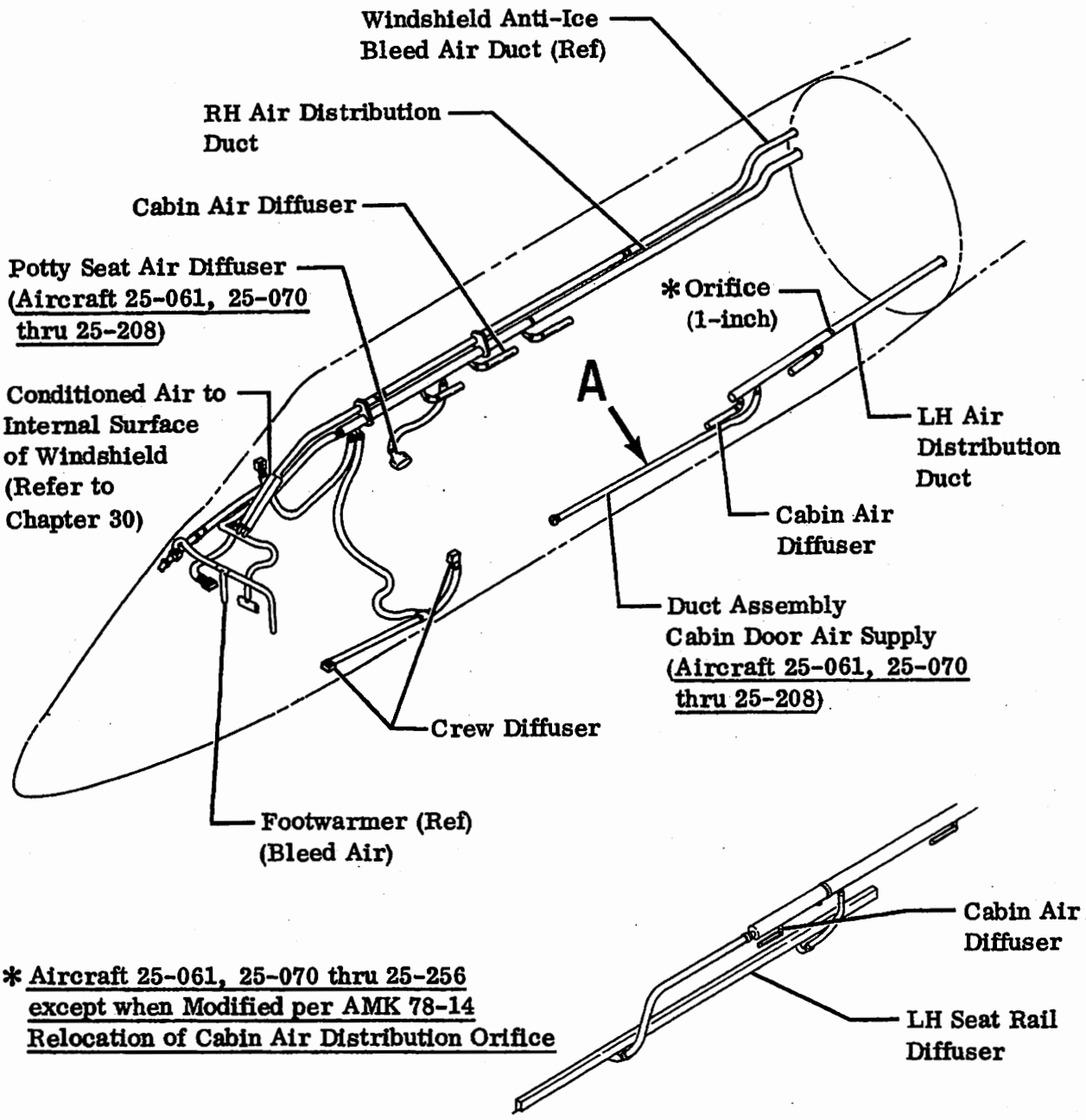


Detail A

Aircraft 25-279 and Subsequent

Cabin Air Distribution Duct Installation
Figure 201 (Sheet 1 of 2)

13-9C-6
13-148C



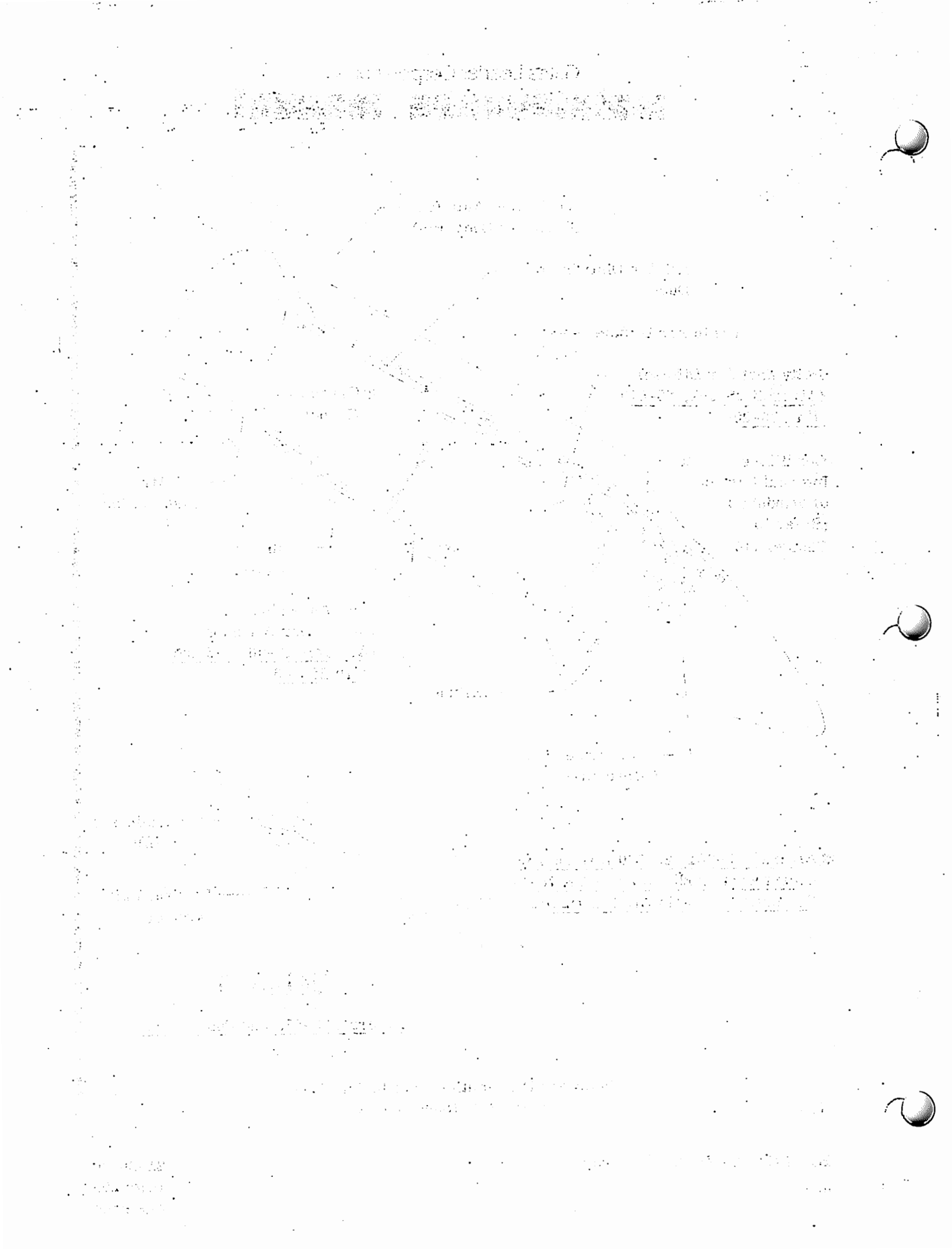
* Aircraft 25-061, 25-070 thru 25-256 except when Modified per AMK 78-14 Relocation of Cabin Air Distribution Orifice

Detail A

Aircraft 25-279 and Subsequent

Cabin Air Distribution Duct Installation
Figure 201 (Sheet 2 of 2)

13-9C-6
13-14&C



AIR CIRCULATION - DESCRIPTION AND OPERATION

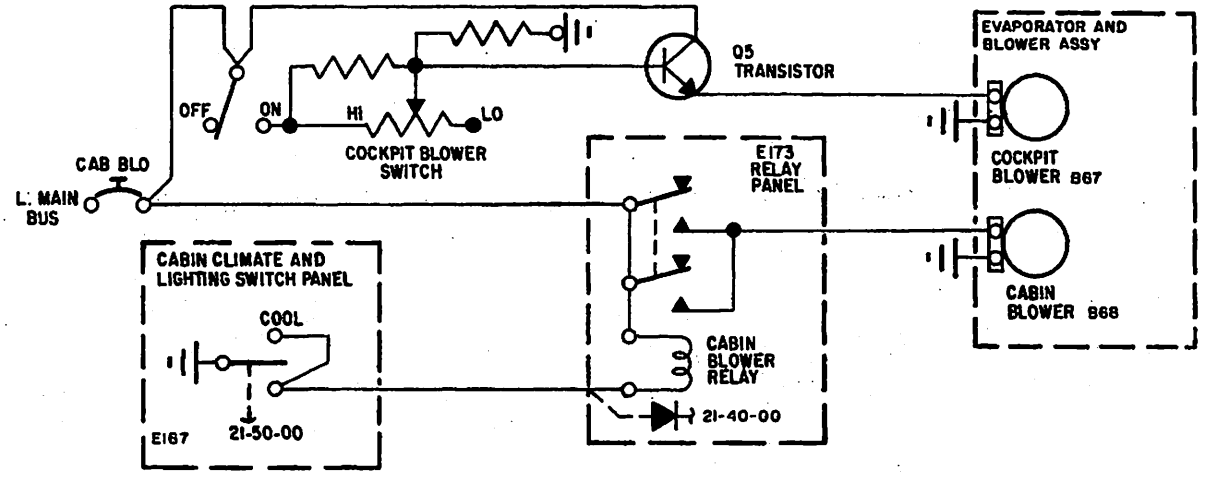
1. Description

A. The cabin blower system utilizes a blower assembly located in the aft portion of the cabin. The blower is controlled by the FAN-OFF Switch located on the cabin climate control panel. When the switch is set to FAN, the cabin blower relay is energized applying 28 vdc to the cabin blower.

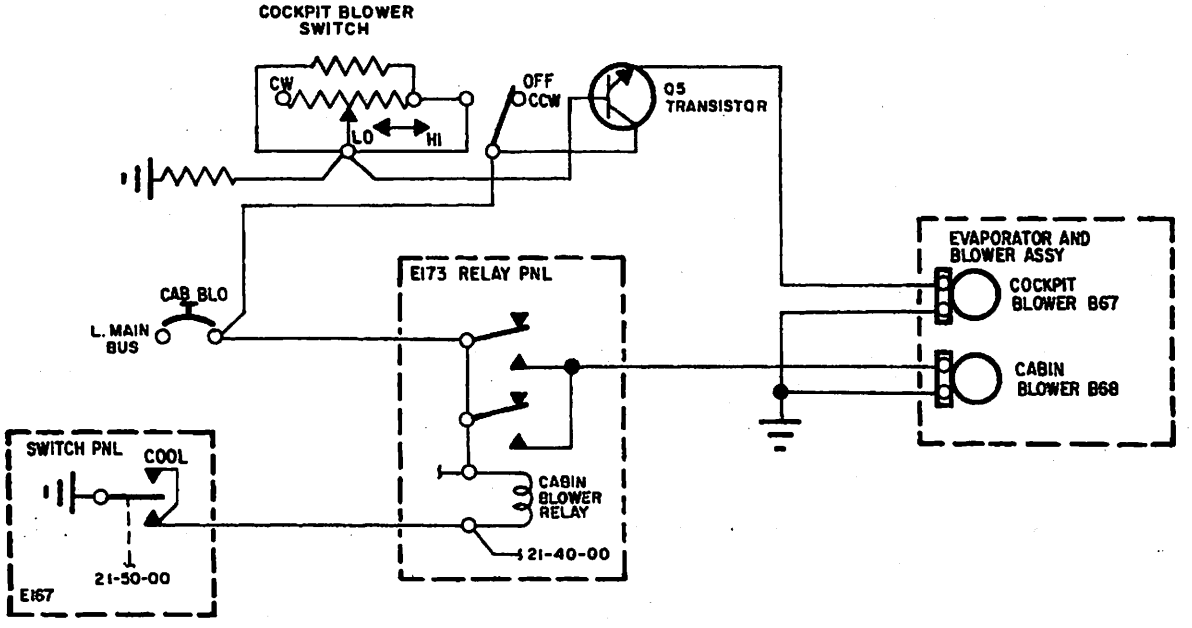
NOTE: On Aircraft equipped with refrigeration system, the blower assembly can be operated without using the refrigeration system by setting the cooling system COOL/FAN Switch to FAN.

B. The cockpit blower system utilizes a fan installed between the outlet ducts of the evaporator and blower assembly. Air is ducted down both sides of the upper center panel to individual outlets in the cockpit headliner. A grill portion of the outlet allows the crew to adjust cockpit air flow. The fan, a vane-axial type (1/12 hp rated at 14,200 rpm), is controlled by a rheostat-type Cockpit Air Switch located adjacent to the copilot's Map Light Switch.

C. A transistor and heat sink assembly (Q5) is installed on the RH side of the nose compartment, forward of frame 2 between stringers 11 and 14.



AIRCRAFT NOT EQUIPPED WITH REFRIGERATION SYSTEM



AIRCRAFT EQUIPPED WITH REFRIGERATION SYSTEM

Cabin and Cockpit Blower Systems Electrical Control Schematic
Figure 1

COCKPIT COOLING FAN - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove cooling fan (See figure 201.) (25C/F Aircraft)

(1) Remove evaporator and blower assembly from aircraft. (Refer to 21-50-06 for applicable removal procedure.)

(2) Remove screws and cover from evaporator and blower assembly.

(3) Disconnect cooling fan electrical wiring at splice. Tag wiring.

(4) Remove safety wire from screws securing forward end of cooling fan to cockpit cooling duct.

(5) Loosen clamps and remove cooling fan from evaporator and blower assembly.

B. Install Cooling Fan (See figure 201.) (25C/F Aircraft)

(1) Install cooling fan (electrical wiring at top) and secure with clamps.

(2) Secure duct to forward end of cooling fan with screws. Safety wire screws.

(3) Connect electrical wiring at splice.

(4) Install cover on evaporator and blower assembly and secure with screws.

(5) Install evaporator and blower assembly. (Refer to 21-50-06 for applicable installation procedures.)

C. Remove Cooling Fan (See figure 201.) (25B/D Aircraft)

(1) Remove headliner from baggage compartment.

(2) Loosen clamps and hoses securing forward transition duct to cockpit air ducts. Remove forward transition duct from cooling fan.

(3) Cut cooling fan wiring at splice.

(4) Loosen clamp securing cooling fan and remove cooling fan from aircraft.

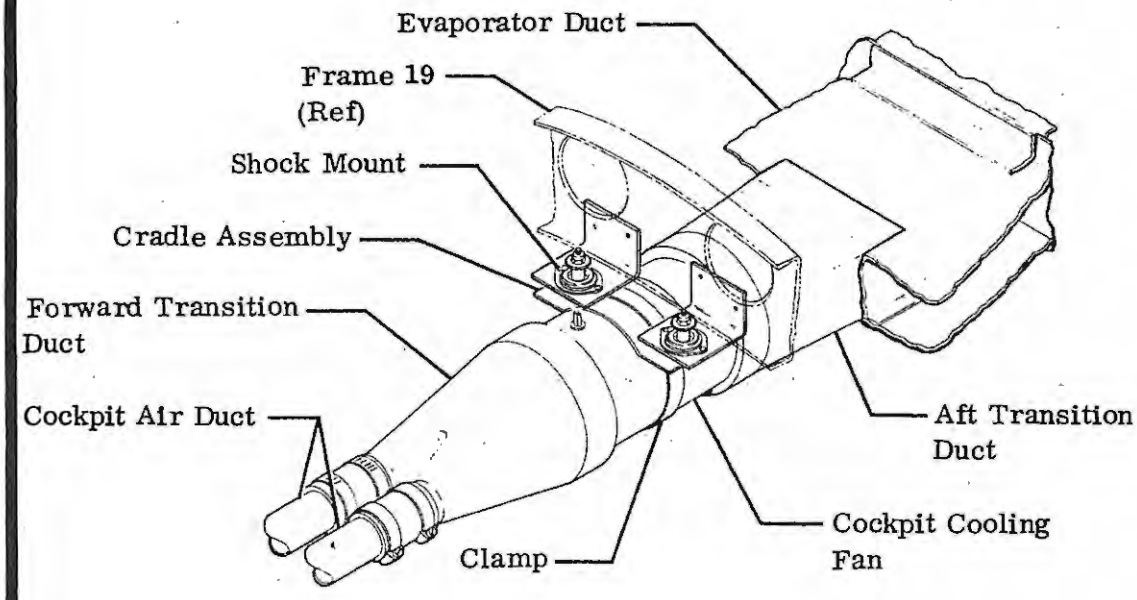
D. Install Cooling Fan (See figure 201.) (25B/D Aircraft)

(1) Install cooling fan and secure with clamp.

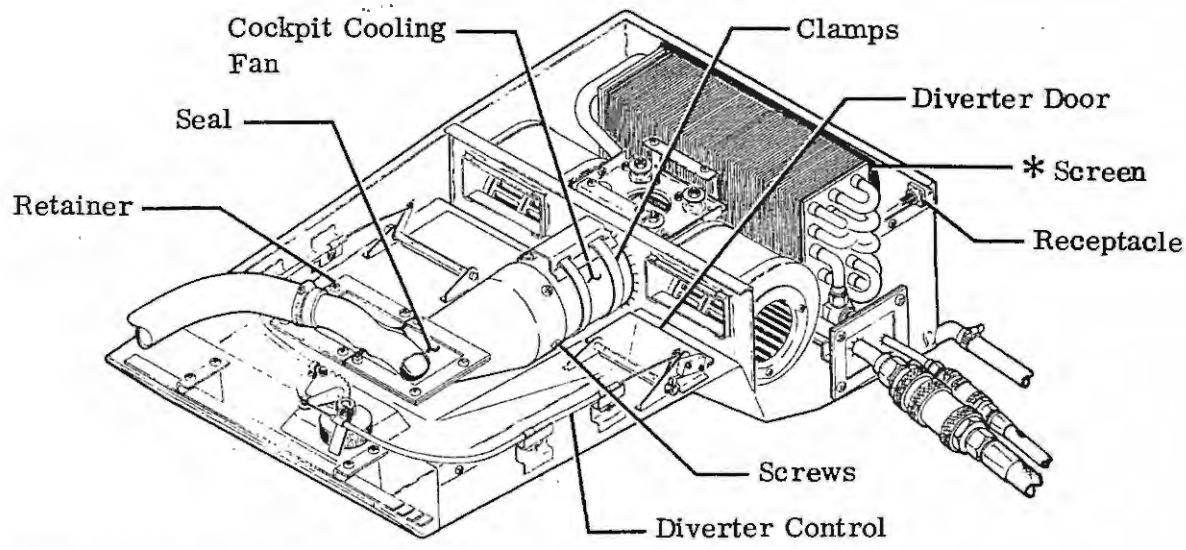
(2) Cut off excess cooling fan wiring, if necessary, and splice to aircraft wiring.

(3) Install forward transition duct and secure to cockpit cooling ducts with clamps and hoses.

(4) Install headliner in baggage compartment.



25B/D Aircraft



* On 25C/F Aircraft equipped with cabin blower system, the evaporator is removed and a screen is installed over the evaporator and blower opening.

25C/F Aircraft

Cockpit Cooling Fan Installation
Figure 201

13-41D-4
13-52A-1

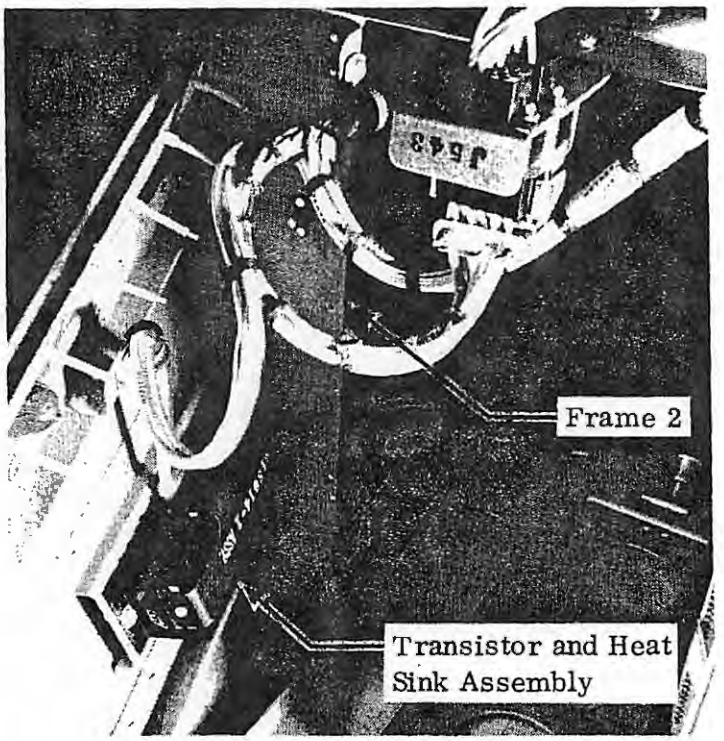
TRANSISTOR AND HEAT SINK - MAINTENANCE PRACTICES

NOTE: Maintenance practices on the transistor and heat sink assembly consist of replacement of transistor if found defective.

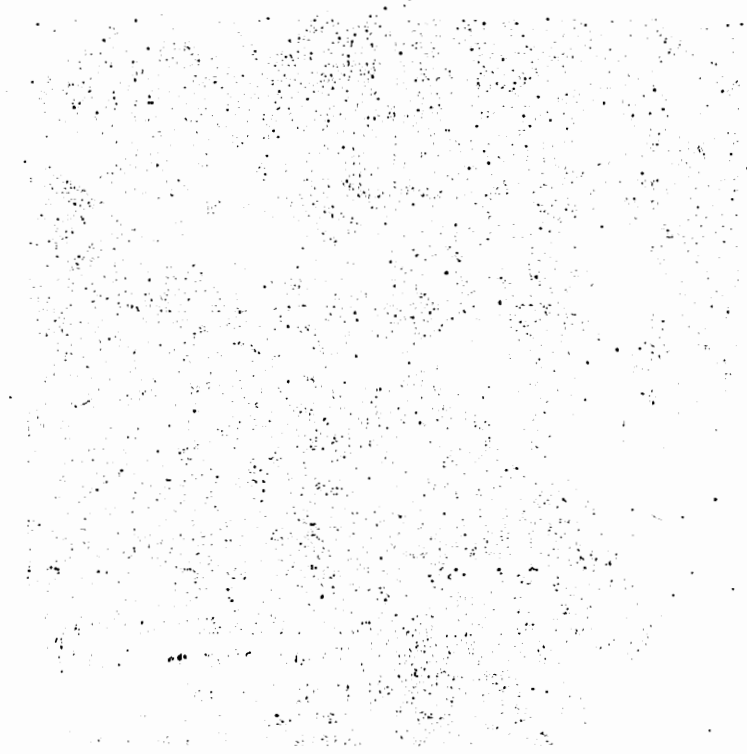
1. Removal/Installation

A. Replacement of Transistor

(1) Remove electrical power from aircraft.
(2) Remove nose compartment doors.
(3) Remove attaching parts and cover from transistor and heat sink assembly.
(4) Remove attaching parts securing transistor to heat sink assembly and remove transistor.
(5) Remove old insulator and clean grease from transistor socket.
(6) Apply a coat of heat sink grease (Dow Corning 340 or equivalent) between heat sink and insulator, and between insulator and transistor.
(7) Install transistor and secure with attaching parts.
(8) Install cover and secure with attaching parts.
(9) Install and secure nose compartment doors.
(10) Restore electrical power to aircraft.



Transistor and Heat Sink Installation
Figure 201



PRESSURIZATION - DESCRIPTION AND OPERATION

1. Description (See figure 1)

A. The cabin pressurization control system provides cabin pressurization at a constant (isobaric) altitude, which is selectable from sea level to 10,000 feet. Cabin pressurization is provided by conditioned air entering the cabin through the air distribution ducts, and controlled by modulating the amount of air exhausted from the cabin through the cabin air exhaust control valve. The pressurization control system can be operated either manually or automatically.

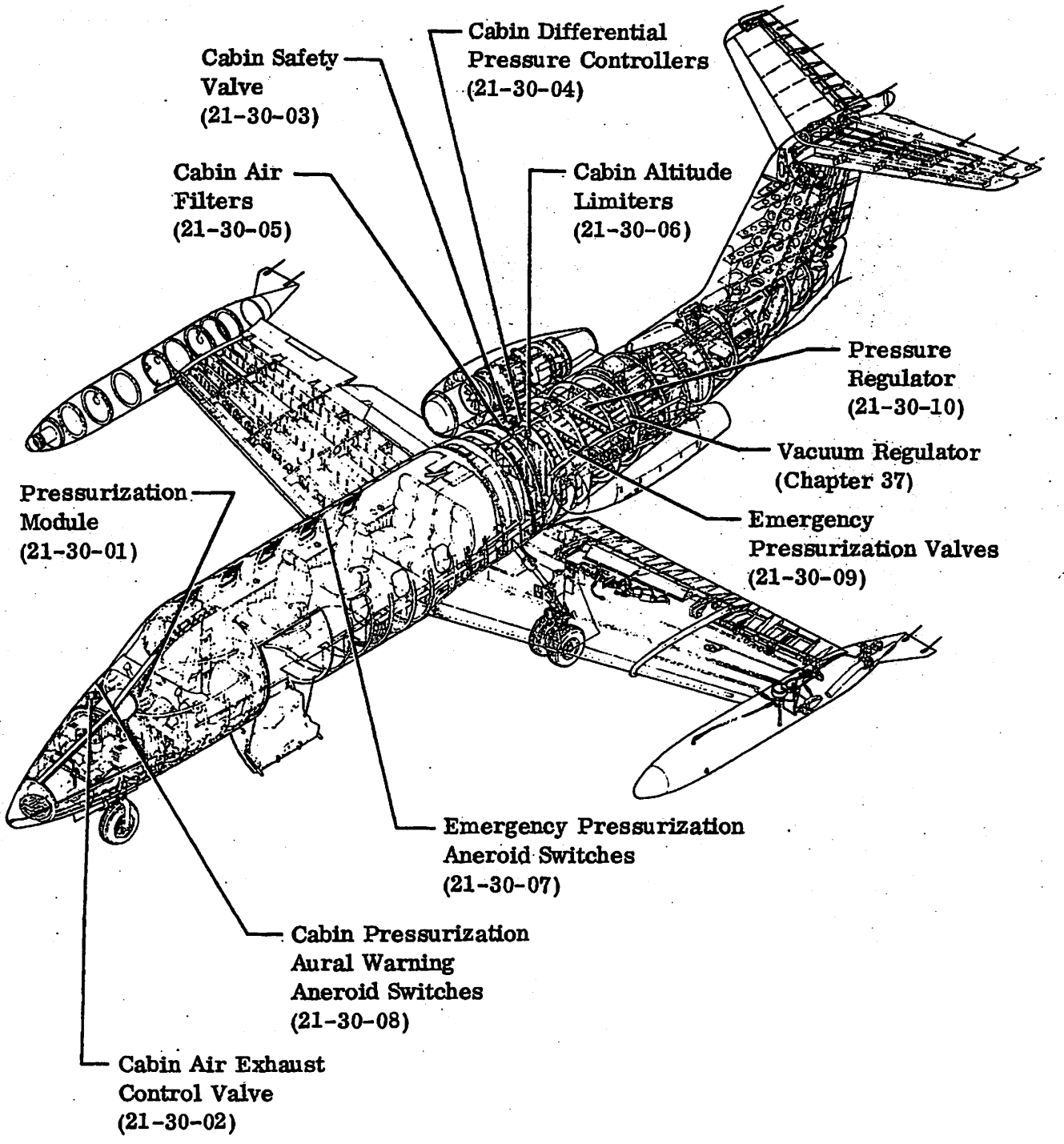
B. Components of the pressurization system consist of a pressurization module, a cabin air exhaust control valve, a cabin safety valve, differential pressure controllers, a pressurization jet pump or vacuum regulator (refer to Chapter 37), air filters, cabin altitude limiters, aneroid switches, and a cabin pressurization warning system. On Aircraft 25-227 and Subsequent, a vacuum shutoff solenoid valve, two emergency pressurization valves, a pressure regulator, and a cabin altitude (CAB ALT) warning light are also installed.

C. A trouble shooting table is provided listing possible troubles, the conditions under which the trouble occurred, a list of probable causes, and references to trouble shooting test and isolation procedures.

D. Component Description

(1) The pressurization module (21-30-01) is installed below the copilot's instrument panel. It is hinged at the back to allow easy access. The copilot's instrument panel is secured to the module structure by four screws. On Aircraft 25-061, 25-070 thru 25-226, the module consists of a rate selector, rate controller, cabin altitude controller, volume control box, manual cabin altitude control valve, differential pressure controller, three solenoid valves, cabin differential pressure indicator, cabin rate-of-climb indicator, 0.040-inch orificed air filter assembly, Air Bleed Switch, and a Pressurization AUTO-MAN Switch.

On Aircraft 25-227 and Subsequent, the module consists of a cabin pressure controller (mini-controller, which incorporates a 0.040-inch orifice, the rate controller and rate selector), a volume control chamber, a manual cabin altitude control valve, a cabin altitude limiter, a differential pressure controller, three solenoid valves, two aneroid switches, a Cabin Air Switch, air filter, a Pressurization AUTO-MAN Switch, a cabin differential pressure indicator, and a cabin rate-of-climb indicator. On Aircraft 25-257 and Subsequent, the emergency bleed air switches are relocated in the pressurization module control panel.



Pressurization System Components Locator
Figure 1

(a) The rate selector (Aircraft 25-061, 25-070 thru 25-226) is basically a needle valve employed as a variable orifice. The rate selector knob is used to position the needle valve, used in metering control pressure to the rate reference chamber of the rate controller.

(b) The rate controller (Aircraft 25-061, 25-070 thru 25-226) consists basically of a housing assembly with a cover at each end. The housing and covers are separated by two diaphragms: an up rate diaphragm and a down rate diaphragm. This forms three chambers: the up rate chamber, down rate chamber, and the rate reference chamber. As normal pressurization is initiated, the regulated vacuum is metered through the metering valve in the up rate chamber. The metering valve, being spring loaded open, will start to close as the pressure decreases in the up rate chamber. Control pressure metered through the rate selector to the rate reference chamber will stabilize the position of the up rate metering valve, allowing the regulated vacuum to be metered at a selected rate. The rate of vacuum metered into the up rate chamber can be varied by the selection of the rate controller. The reduced control pressure is also sensed in the down rate chamber, and the down rate needle valve opens and meters cabin pressure directly to the vacuum source.

(c) The cabin altitude controller (Aircraft 25-061, 25-070 thru 25-226) consists of an evacuated bellows connected to a metering valve. The metering valve controls the amount of vacuum metered to the rate controller. As cabin pressure increases, the evacuated bellows contracts, bypassing more vacuum to the rate controller.

(d) The cabin pressure controller (Aircraft 25-227 and Subsequent) is composed of three elements. The first element forms a chamber which is open to cabin pressure and houses the absolute bellows. One side of the second element, when assembled to the first element, completes the cabin pressure chamber. The opposite side of the second element forms a rate pressure chamber which houses the rate spring. The second element also contains the rate control valve and orifice, and an air passage to allow movement of air to the volume control chamber. The third element, when assembled to the rate diaphragm, and the other two elements, forms a reference pressure chamber which houses the reference pressure metering valve and metering valve follower spring. This element also contains passages for air to

pass from the cabin pressure controller to its appropriate location in the pressurization module. The cabin air inlet fitting located on the rear of the third element contains a 0.040-inch orifice, thus eliminating the need of an orificed fitting at the filter element as required prior to Aircraft 25-227.

(e) The volume control box (Aircraft 25-061, 25-070 thru 25-226), and the volume control chamber (Aircraft 25-227 and Subsequent) act as dampers for changes in cabin altitude rate selection.

(f) The manual cabin altitude control valve provides manual control of cabin pressurization by the manipulation of the manual UP-DN control valve knob located on the pressurization module control panel. The valve is spring loaded to return to neutral position, allowing cabin pressurization to be maintained at the desired level.

(g) The cabin differential pressure controller located in the pressurization module opens the cabin air exhaust control valve, venting excess pressure to ambient when the cabin-to-atmosphere differential pressure becomes too great. For additional information pertaining to the differential pressure controller, refer to step 1.D.(4).

(h) The solenoid valves control passage of air to components in the pressurization control system.

(i) The cabin altitude and differential pressure gage is vented to ambient pressure and to cabin pressure. The gage has two pointers, each traveling over a separate arc of calibrations. The large (outside) pointer shows cabin altitude, the smaller pointer indicates differential pressure (between cabin and outside air) in pounds per square inch.

(j) The rate-of-climb indicator indicates the rate of change of cabin pressure.

(k) The pressurization module air filter assembly is utilized to remove contaminants from the air used to operate the pressurization control system. For additional information pertaining to air filters, refer to step 1.D.(5).

(l) The cabin altitude limiter (Aircraft 25-227 and Subsequent) is used to sense cabin pressure and close the cabin air exhaust control valve should cabin altitude continue to increase during flight. For additional information pertaining to cabin altitude limiters, refer to step 1.D.(6).

(m) Aneroid switches are used to sense cabin depressurization. For additional information pertaining to aneroid switches, refer to step 1.D.(7).

(n) The Cabin Air Switch (Aircraft 25-227 and Subsequent) is located on the pressurization module control panel. Refer to the pressurization system operation section for additional information.

(2) The cabin air exhaust control valve (21-30-02) is installed on frame 5 forward of the instrument panel. It consists of a poppet, a balance diaphragm, and an actuator diaphragm contained within a base and cover. The cover contains two openings. On Aircraft 25-061, 25-070 thru 25-226 not Modified per AMK 78-5, Installation of Cabin Altitude Pressure Limiter, one opening provides a connection for the control pressure line from the pressurization module, and the other opening is plugged. On Aircraft 25-061, 25-070 thru 25-226 Modified per AMK 78-5, a hose is routed from one opening of the cabin air exhaust control valve to a cabin altitude limiter, installed on frame 5 adjacent to the cabin air exhaust control valve, then from the cabin altitude limiter to the pressurization module. The other opening is plugged. The cabin air exhaust control valve modulates the amount of air flow from the cabin to ambient and is the primary source of cabin air discharge.

(3) The cabin safety valve (21-30-03) is located on a manifold assembly, secured to frame 18 on 25 C/F Aircraft. On 25 B/D Aircraft, the cabin safety valve is installed on frame 22. The cabin safety valve is identical to the cabin air exhaust control valve and is controlled by the cabin differential pressure controller and altitude limiter. The cover provides openings for a static line, and a 0.025-inch orificed filter assembly. The cabin safety valve is the secondary source of cabin air discharge should the normal pressurization system malfunction and fail to maintain the selected cabin altitude.

(4) There are two differential pressure controllers (21-30-04) installed in the aircraft. One is located in the pressurization module and the other is located in the aft cabin area on frame 18 (25C/F Aircraft), or on frame 22 (25B/D Aircraft). Each differential pressure controller consists of a valve, a valve housing, a diaphragm, and two springs enclosed in a housing and cover. The differential pressure controllers provide a positive pressure relief signal to their appropriate exhaust valve.

(5) Three air filter assemblies are utilized in the pressurization control system (21-30-05). One filter assembly is installed in the pressurization module, one on the cabin safety valve, and one on the aft pressure bulkhead. The filters are utilized to remove contaminants from the air used to operate the pressurization control system.

There are three types of filter assemblies utilized in the pressurization control system: a cleanable foam-type, a paper throwaway-type, and a nut-type. The filters should be cleaned or replaced at the time interval specified in Chapter 5.

WARNING: THE PRESSURIZATION SYSTEM FILTERS ARE NOT INTERCHANGEABLE DUE TO THE ORIFICE IN THE FILTER STUD ASSEMBLIES.

(a) The foam type filter assembly consists of a snap ring, retainer, top cap, cleanable foam-type filter element, spring, base cap, orificed filter stud, and o-ring. It is utilized in the pressurization module on Aircraft 25-061, 25-070 thru 25-226 (with a 0.040-inch orificed filter stud) not Modified per SSK 940, Replacement of Pressurization Module Filter, on the cabin safety valve on Aircraft 25-061, 25-070 thru 25-226 (with a 0.025-inch filter stud), and on the aft pressure bulkhead on Aircraft 25-061, 25-070 thru 25-226 (with a 0.2335-inch orificed filter stud). The paper throwaway-type filter assembly is utilized as a replacement spare for the foam-type filter assembly.

(b) The paper throwaway-type filter assembly is utilized in the pressurization module on Aircraft 25-061, 25-070 thru 25-226 (with a 0.040-inch orificed filter stud) Modified per SSK 940, and on Aircraft 25-227 and Subsequent (without an orificed filter stud). It is also utilized on the cabin safety valve on Aircraft 25-227 and Subsequent (with a 0.025-inch orificed filter stud). On Aircraft 25-061, 25-070 thru 25-226, the paper throwaway-type filter assembly is utilized as a replacement spare filter for the foam-type filter assembly.

(c) The nut-type filter assembly consists of a snap ring, screen, filter body, and o-ring. It is utilized on the aft pressure bulkhead on Aircraft 25-227 and Subsequent.

(6) There are two cabin altitude limiters (21-30-06) located in the aircraft, one in the forward cabin area and one in the aft cabin area. The cabin altitude limiters consist of an evacuated capsule, poppet, and valve spring enclosed in a housing and housing cover. A cabin air pressure inlet with FILTER port and screen, a CONTROL port, and a VALVE port are located in the cabin altitude limiter housing.

On Aircraft 25-061, 25-070 thru 25-226 Modified per AMK 78-5, Installation of Cabin Altitude Pressure Limiter, the forward cabin altitude limiter is installed on the aft side of frame 5, plumbed between the cabin air exhaust control valve and the pressurization module. On Aircraft 25-227 and Subsequent, the forward cabin altitude limiter is installed in the pressurization module. On 25 B/D Aircraft, the aft cabin altitude limiter is installed on frame 18; on 25 C/F Aircraft, on frame 22. The aft cabin altitude limiter is plumbed between the cabin safety valve and the aft differential pressure controller. The cabin altitude limiters are used to sense cabin pressure and close the cabin air exhaust control valve or cabin safety valve at calibrated altitudes should cabin altitude continue to increase during flight.

(7) On Aircraft 25-061, 25-070 thru 25-226, a cabin air exhaust control valve aneroid switch (21-30-07) is installed in the pressurization module adjacent to the rate controller. A cabin pressurization aural warning aneroid switch (21-30-08) is installed on the RH cockpit inner skin at FS 169. On Aircraft 25-227 and Subsequent, two aneroid switches are installed in the pressurization module: one a cabin air exhaust control valve aneroid switch and the other an aural warning aneroid switch (21-30-08). Two emergency pressurization aneroid switches (21-30-07) are located in the cabin area. On 25D Aircraft, the emergency pressurization aneroid switches are located on frame 19 (LH and RH sides), adjacent to stringer 9. On 25F Aircraft, the emergency pressurization aneroid switches are located on stringer 3L and 3R aft of frame 16.

(8) On Aircraft 25-227 and Subsequent, a normally closed vacuum shutoff solenoid valve is installed between the regulated vacuum line and the cabin safety valve. The solenoid valve closes prior to take-off, allowing the cabin safety valve to move to the closed position.

(9) On Aircraft 25-227 and Subsequent, two emergency pressurization valves are installed (21-30-09), one in the RH bleed air duct and one in the LH bleed air duct. The emergency pressurization valves are installed to provide the aircraft with emergency pressurization should the normal pressurization system fail to maintain a cabin altitude below 9,500 (±250) feet.

(10) On Aircraft 25-227 and Subsequent, a pressure regulator (21-30-10) is installed in the tailcone equipment section. The pressure regulator provides a regulated pressure (servo pressure) to the flow control valve and the emergency pressurization valves.

(11) The cabin pressure warning system consists of aural warning and a CAB ALT caution light. On Aircraft 25-061, 25-070 thru 25-226, the aural warning aneroid switch is on the cockpit RH side at FS 169, adjacent to the mach warning switch. On Aircraft 25-227 and Subsequent, the aural warning aneroid switch is in the pressurization module. The CAB ALT caution light exists only on Aircraft 25-227 and Subsequent and is controlled by the same aneroid switch as the cabin air exhaust control valve.

2. Operation (See figures 2 and 3.)

A. Ground Operation (Aircraft 25-061, 25-070 thru 25-226)

(1) During ground operation with the Pressurization AUTO-MAN Switch set to AUTO and Air Bleed Switch set to NORM, the two normally open solenoids in the pressurization module are electrically held closed and the normally closed solenoid is held open through the squat switch relay panel. In this condition, the regulated vacuum from the pressurization jet pump (vacuum regulator) is applied to the cabin air exhaust control valve control chamber. The pressure in the control chamber decreases, causing an unbalanced condition to exist between the control chamber and balance chamber. The cabin air exhaust control valve opens and vents cabin pressure to ambient and maintains a maximum of 0.25 psi differential.

B. Flight Operation (Aircraft 25-061, 25-070 thru 25-226)

(1) During flight operation, with the Pressurization AUTO-MAN Switch set to AUTO and Air Bleed Switch set to NORM, power is removed from the electrically closed solenoids and the electrically open solenoid. Regulated vacuum is applied through the normally open solenoid and cabin altitude controller to the up rate chamber of the rate controller. Initially the cabin pressure that is vented through the orificed filter is a greater pressure than the vacuum being metered through the altitude controller. This holds the cabin air exhaust control valve in

its last attained position. As the cabin air exhaust control valve closes, the increased cabin pressure (decreased cabin altitude) is sensed by the altitude controller, which meters more vacuum to the rate controller. As more vacuum is metered to the rate controller, the ratio of pressure to vacuum decreases. The reduced pressure in the up rate chamber is sensed by the cabin air exhaust control valve control chamber. With the changing control chamber pressure, an unbalanced condition will exist and move the cabin air exhaust control valve open until the proper amount of air is exhausted to maintain the required altitude controller selection. The reduced pressure is also sensed in the rate chamber of the rate controller and as pressure decreases, the down rate needle valve opens, metering more cabin pressure to the vacuum source. An aneroid switch within the pressurization module will limit cabin altitude to 10,000 feet when in the AUTO mode of operation. With the Pressurization AUTO-MAN Switch in the MAN position, the cabin altitude is controlled by manually positioning the manual UP-DN control valve knob. If the aircraft is inadvertently allowed to ascend and exceed the controlling limits of the differential pressure controller for the cabin safety valve, it will modulate the cabin safety valve outflow to maintain a 9.2 psi differential. A cabin altitude limiter is installed between the cabin safety valve and the differential pressure controller and will limit cabin pressure if the differential pressure controller should fail and allow the cabin safety valve to open. The cabin altitude limiter will control the cabin safety valve rate-of-modulation to maintain a cabin altitude of approximately 11,000 feet. Should rapid descent cause a negative pressure in the cabin, both the cabin air exhaust control valve and the cabin safety valve will open to admit atmospheric pressure to the cabin.

(2) In case of normal cabin airflow malfunction, emergency pressurization is provided by routing all windshield defog air into the cabin. This is accomplished by pushing the IN NORMAL/OUT DEFOG defog control knob to IN NORMAL (full in), setting the Windshield Heat Switch to AUTO, and setting the Air Bleed Switch to OFF. Refer to Chapter 30 for further information on the windshield anti-ice system. With the bleed air off, the flow control valve is closed, routing all bleed air through the anti-ice shutoff valve and pressure regulator valve into the windshield anti-ice system. Temperature control will not be available. Pressurization will then be maintained automatically. If pressurization cannot be maintained in the AUTO mode, cabin pressure (altitude) can be maintained by setting the Pressurization AUTO-MAN Switch to MAN and controlling the cabin air exhaust control valve using the manual UP/DN control valve knob.

C. Ground Operation (Aircraft 25-227 and Subsequent)

(1) During ground operation, Pressurization AUTO-MAN Switch set to AUTO and Cabin Air Switch set to ON, the two normally open solenoids in the pressurization module are electrically held closed and the normally closed solenoid is held open through the squat switch relay panel. While the aircraft is on the ground and the Cabin Air Switch set to OFF, the vacuum shutoff solenoid valve (NC) is electrically held open through a set of de-energized relay contacts in the squat switch relay panel. When the Cabin Air Switch is set to ON, power is applied to the de-energized relay and to a 15 second delay timer. After 15 seconds, the relay energizes, opening the power and ground circuits to the vacuum shutoff solenoid and allows the shutoff solenoids to move to its normally closed position. The increasing cabin pressure in the cabin safety valve control chamber will allow the cabin safety valve to close.

D. Flight Operation (Aircraft 25-227 and Subsequent)

(1) During flight, power is removed from the electrically operated solenoids which makes the pressurization system completely independent of the electrical system. Cabin air flows through the cabin air filter, through an orifice, into the reference pressure chamber of the cabin pressure controller (mini-controller), and out through the reference pressure metering valve to aircraft vacuum. The pressure drop caused by cabin air flowing through the orifice establishes reference pressure which is slightly lower than cabin pressure. The reference pressure, being slightly lower than the rate pressure, causes the rate pressure to flow through the rate control valve. The metering valve will modulate until the differential pressure across the rate diaphragm equalizes. The reference pressure metering valve modulates until cabin air flowing through the orifice is approximately a steady flow, which establishes an essentially constant reference pressure. The cabin air exhaust control valve control chamber receives reference pressure from the cabin pressure controller (mini-controller). Constant reference pressure will be obtained when the selected cabin altitude is reached. Any increase in cabin altitude is sensed by the absolute bellows in the cabin pressure controller (mini-controller) which expands slightly to reposition the reference pressure metering valve. The new position of the metering valve will restrict the flow of reference pressure, allowing the cabin air exhaust control valve to modulate toward the closed position. Any decrease in cabin altitude will contract the absolute bellows which will slightly reposition the reference pressure metering valve. The new position of the metering valve will increase the flow of reference pressure and cause the cabin air exhaust control valve to modulate toward the open position.

If the flight plan requires an increase in aircraft altitude during cruise which would produce a cabin-to-atmosphere differential pressure greater than normal isobaric differential pressure, the cabin pressure controller (mini-controller) setting should be changed. The altitude selector knob should be repositioned so that AIRCRAFT ALT indicates the new cruise altitude to preclude the possibility of unscheduled differential pressure control. Upon reselection to a higher altitude, the absolute bellows and reference pressure metering valve are repositioned to change reference pressure; therefore the cabin air exhaust control valve is repositioned. The change in cabin pressure is continuously sensed to expand or contract the absolute bellows to control the flow of cabin air through the cabin air filter and cabin pressure controller (mini-controller) orifice to regulated vacuum. This will change the reference pressure and modulate the cabin air exhaust control valve to maintain the selected cabin altitude.

The descent rate-of-change control of cabin pressure is achieved by the speed at which reference pressure in the cabin pressure controller (mini-controller) flows through the rate control valve into the rate pressure chamber. The ascent rate-of-change control is the reverse flow, or when the rate pressure flows through the rate control valve into the reference pressure chamber. When the differential pressure across the rate diaphragm is approximately equal, the reference pressure and the rate pressure are essentially constant. Reference pressure is sensed in the control chamber of the cabin air exhaust control valve which positions the valve and allows cabin altitude to stabilize at the selected cabin settings. As long as an unbalanced differential pressure exists across the rate diaphragm in the cabin pressure controller (mini-controller), the system will remain on rate-of-change control.

(2) In case of normal cabin airflow malfunction, emergency pressurization is automatically provided by routing engine bleed air directly into the cabin through the emergency pressurization valves. This is accomplished automatically by pressurization aneroid switches when cabin altitude increases to 9500 (±250) feet or when the Bleed Air Switches are set to EMER. With the emergency pressurization valves in the emergency position, engine bleed air is routed directly from the engine into the cabin air distribution ducts. This bypasses all bleed air plumbing in the tailcone area and will stabilize the cabin altitude if a failure has occurred in this area. The solenoids on the emergency pressurization valves are de-energized and the valve goes to its emergency position. During the emergency mode of operation, temperature control, wing, and windshield bleed air anti-ice will not be available.

E. Flight Operation - Manual (Aircraft 25-061, 25-070 and Subsequent)

(1) The cabin pressure control system provides manual control of cabin pressurization by positioning the Mode Switch to MANUAL and manipulating the manual control valve with the UP-DN control valve knob. Manipulation of the manual control valve provides an override of the automatic functions.

(2) If the normal cabin differential pressure controller (located in the pressurization module) or cabin air exhaust control valve fail, the maximum cabin differential pressure controller (located in the aft cabin adjacent to the cabin safety valve) will modulate the cabin safety valve to maintain the proper cabin differential pressure.

(3) A cabin altitude limiter is installed on both the cabin air exhaust control valve and cabin safety valve and will limit cabin altitude if the differential pressure controller should fail and allow either the cabin air exhaust control valve or the cabin safety valve to open. The cabin altitude limiter will control the cabin safety valve or cabin air exhaust control valve rate of modulation to maintain a cabin altitude of 11,000 (±1,000) feet (Aircraft 25-061, 25-070 thru 25-226) or 11,500 (±1,500) feet (Aircraft 25-227 and Subsequent).

(4) Should rapid descent cause a negative pressure in the cabin, both the cabin air exhaust control valve the cabin safety valve will admit atmospheric pressure to the cabin.

F. Aircraft Descent

(1) If the flight plan requires an aircraft altitude which would, at the selected cabin altitude, produce a condition where aircraft altitude either equals or is less than cabin altitude, a reselection to a lower cabin altitude during descent is desirable for passenger comfort. Reselection is desirable since, at equal altitudes, the cabin air exhaust control valve will be full-open and the cabin rate of pressure change follows aircraft rate-of-change and the automatic rate of cabin pressure change is overriden. (This occurs when atmospheric pressure is greater than cabin pressure.) Additionally, the aircraft rate-of-descent, even with a reselected cabin altitude, should be controlled so that it does not catch up with cabin altitude during rate operation.

(2) During descent and in preparation for landing, the altitude selector knob should be set to indicate a cabin altitude of approximately 1,000 feet above landing field altitude. The aircraft rate-of-descent should be controlled so that aircraft altitude does not catch up with the selected cabin altitude during rate-of-change operation. Upon reselection of a lower cabin altitude, the actuator and absolute bellows in the controller tend to move the reference pressure metering valve and

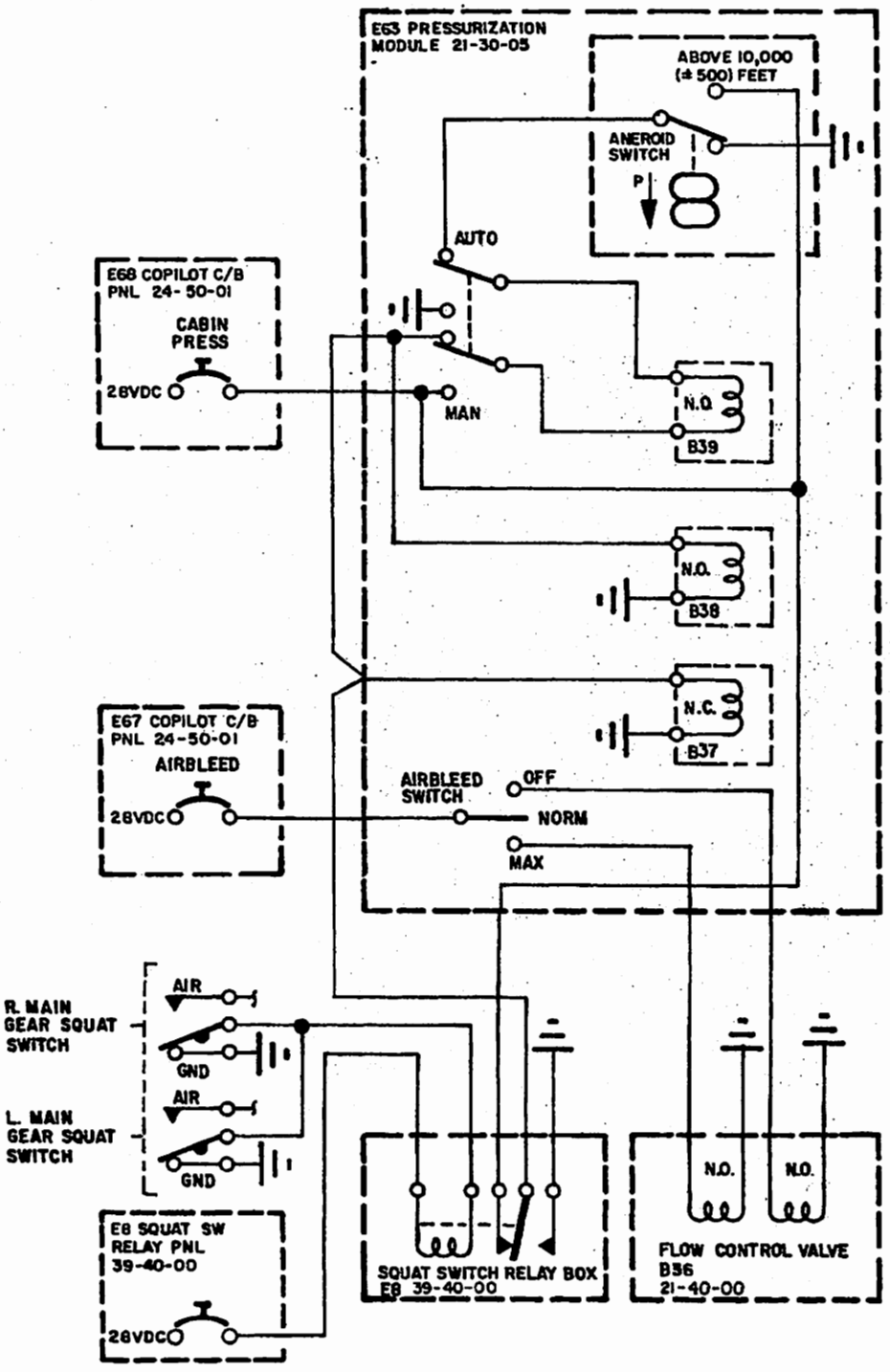
modulate toward the closed position to increase reference pressure and rate pressure. Increased reference pressure is sensed in the control chamber of the cabin air exhaust control valve. The cabin air exhaust control valve pressure increase will cause the cabin air exhaust control valve poppet to modulate toward the closed position until the selected cabin altitude is obtained. The cabin pressure control system will be on rate-of-change control until selected cabin altitude is attained.

G. Landing Operation

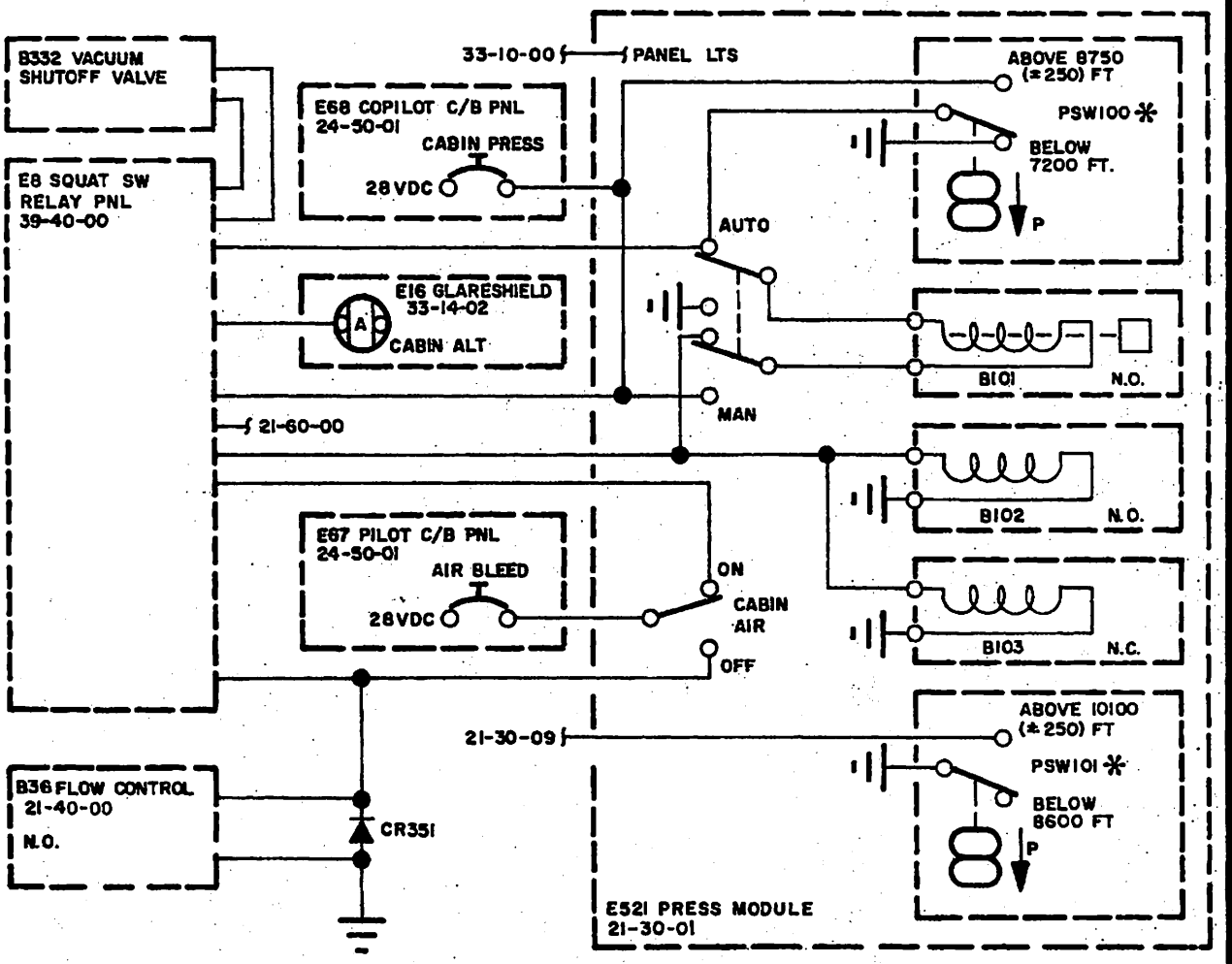
(1) As the aircraft descends and reaches the preselected cabin altitude, the cabin air exhaust control valve modulates toward the open position. As the aircraft descends below preselected cabin altitude, the cabin will be unpressurized and will follow the aircraft rate-of-descent to touchdown. As the aircraft touches down, the landing gear switch will actuate to the ground position, allowing the pressurization module solenoid valves to reenergize. Regulated vacuum will reduce control chamber reference pressure in the cabin air exhaust control valve, allowing the valve to move to the fully open position and the control system to return to minimum differential pressure control.

H. Component Operation

(1) The pressurization module (21-30-01) controls cabin pressure by metering the outflow of cabin air through the cabin air exhaust control valve. Cabin air flows through the pressurization module cabin air filter, through an orifice, into the reference pressure chamber of the cabin altitude controller (Aircraft 25-061, 25-070 thru 25-226), or cabin pressure controller (mini-controller) (Aircraft 25-227 and Subsequent), then out of the controller through the reference pressure metering valve to aircraft vacuum. The pressure drop caused by cabin air flowing through the orifice establishes a reference pressure, which is slightly lower than cabin pressure. The reference pressure, being slightly lower than the rate pressure, causes the rate pressure to flow through the rate control valve. The metering valve will modulate until the differential pressure across the rate diaphragm equalizes. The reference pressure metering valve modulates until cabin air flowing through the orifice is approximately a steady flow, which establishes an essentially constant reference pressure. The cabin air exhaust control valve control chamber receives reference pressure from the cabin pressure controller. Constant reference pressure will be obtained when the selected cabin altitude is reached.

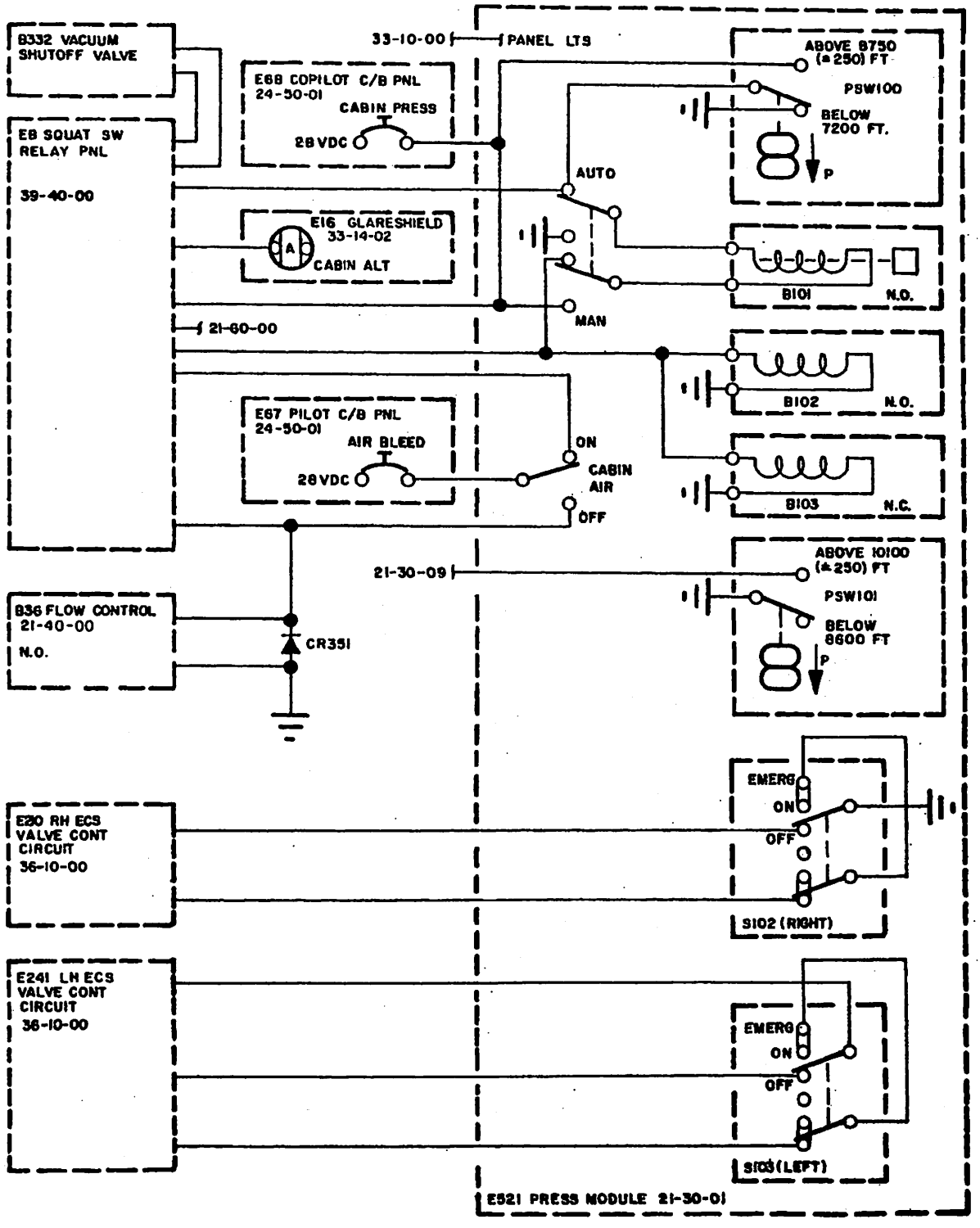


Pressurization System Electrical Control Schematic
Figure 2 (Sheet 1 of 3)

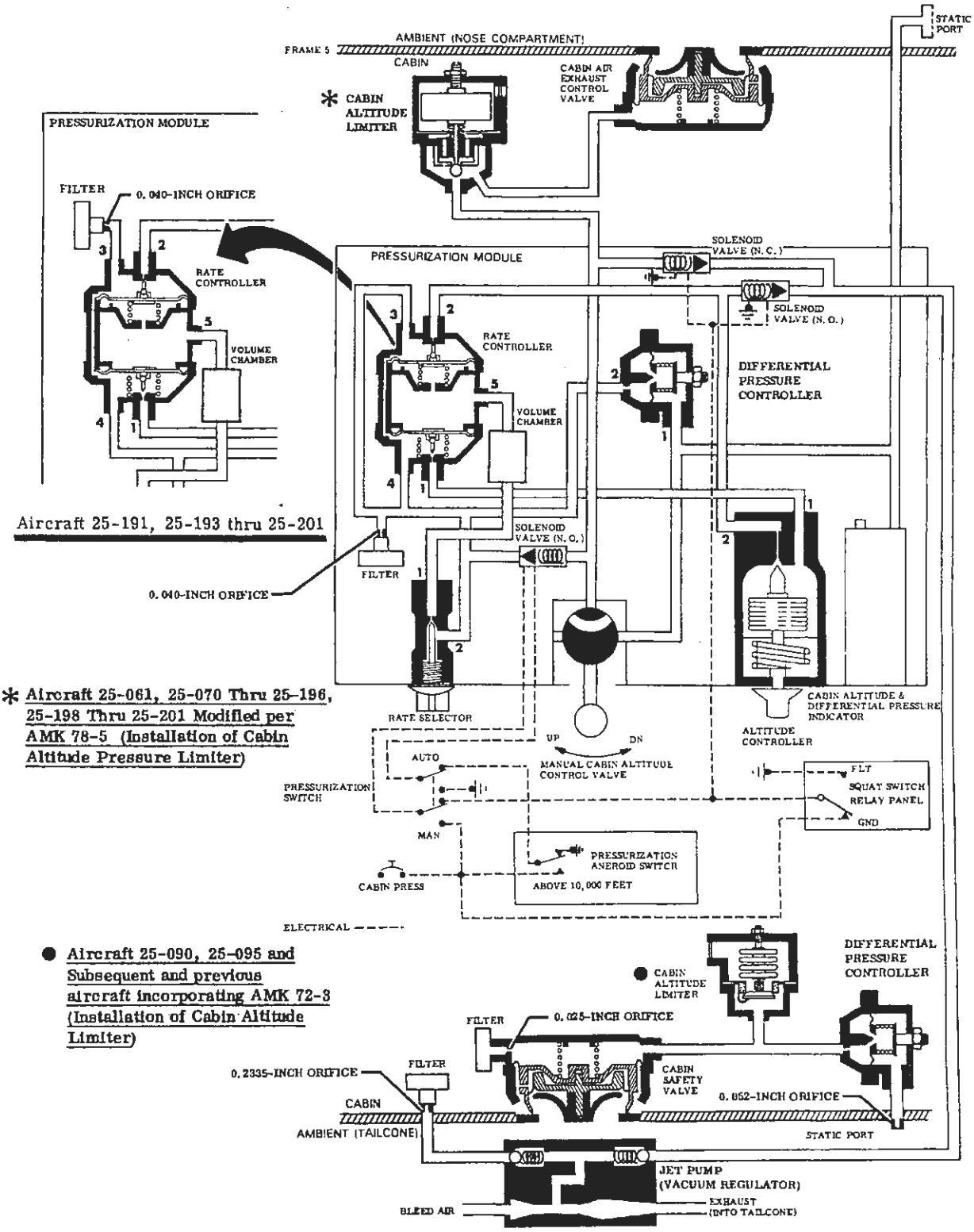


* On Aircraft 25-227 and 25-228 PSW 100 and PSW 101 actuate above 10,000 (±500) feet.

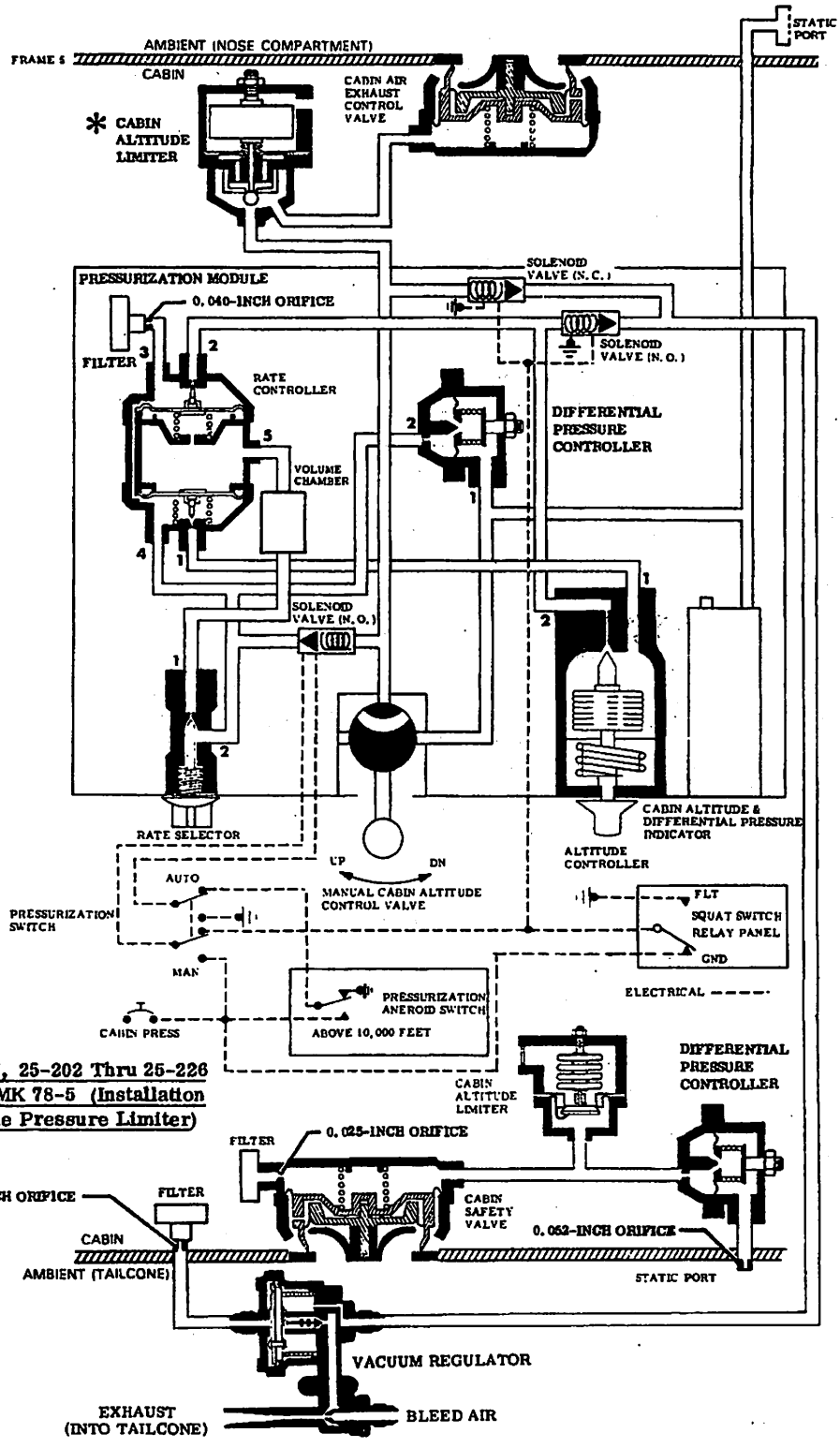
Pressurization System Electrical Control Schematic
Figure 2 (Sheet 2 of 3)



Pressurization System Electrical Control Schematic
Figure 2 (Sheet 3 of 3)

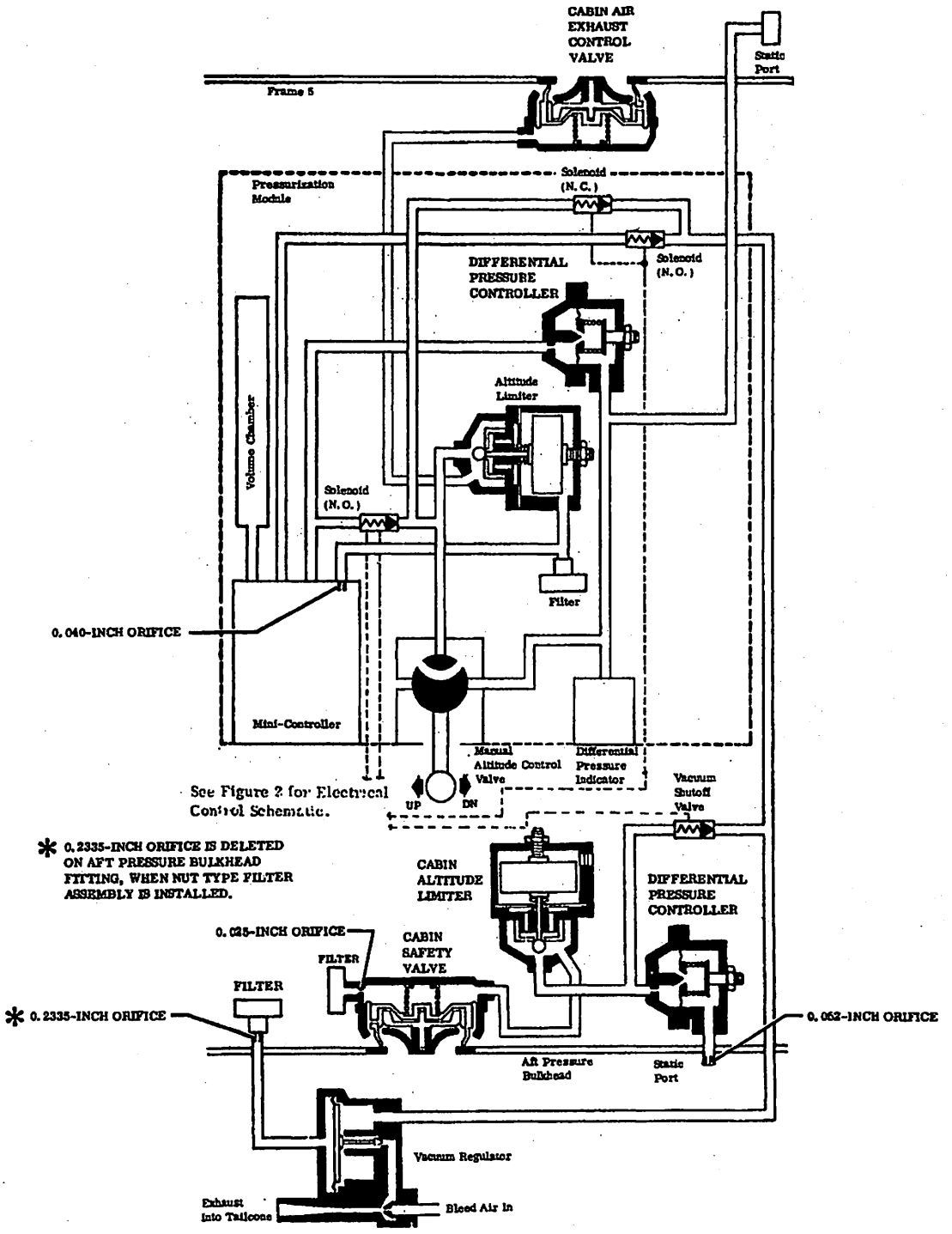


Pressurization System Control Schematic
Figure 3 (Sheet 1 of 3)



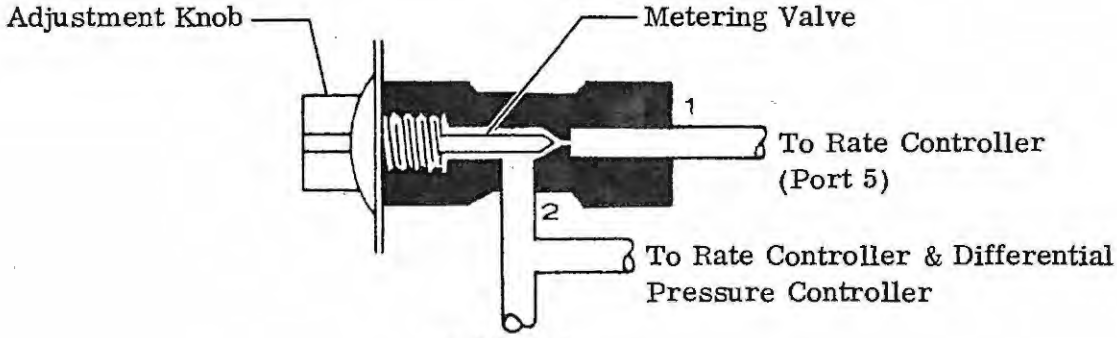
* Aircraft 25-197, 25-202 Thru 25-226 Modified per AMK 78-5 (Installation of Cabin Altitude Pressure Limiter)

Pressurization System Control Schematic
Figure 3 (Sheet 2 of 3)



Pressurization System Control Schematic
Figure 3 (Sheet 3 of 3)

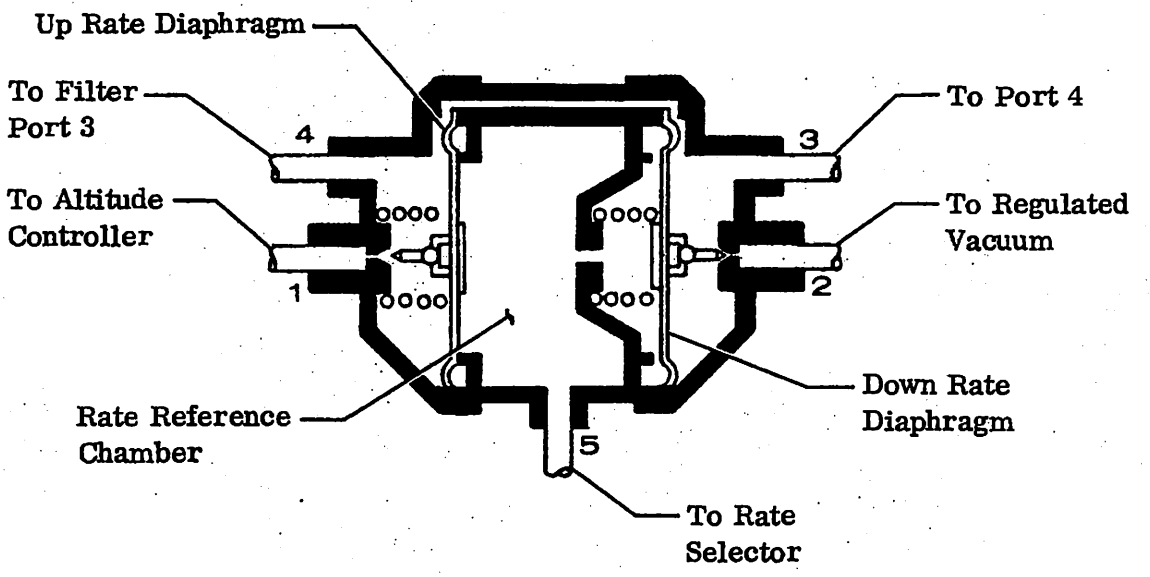
(a) The rate selector (Aircraft 25-061, 25-070 thru 25-226) (See figure 4.) is basically a needle valve employed as a variable orifice. The rate selector knob is used to position the needle valve, used in metering control pressure to the rate reference chamber of the rate controller.



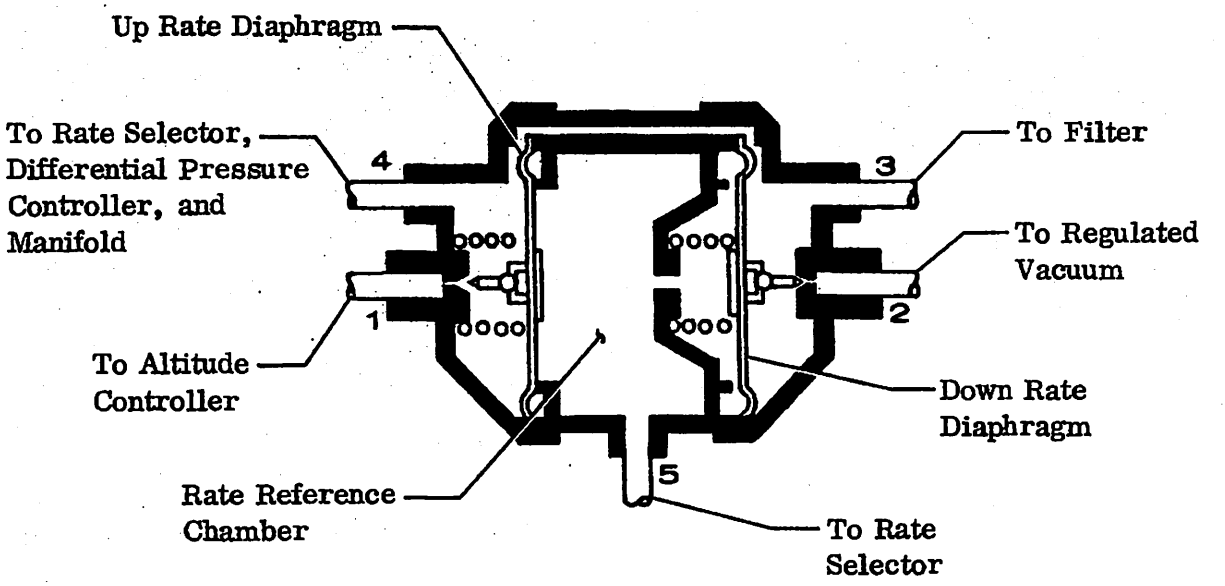
Aircraft 25-061, 25-070 thru 25-226

Rate Selector Schematic
Figure 4

(b) The rate controller (Aircraft 25-061, 25-070 thru 25-226) (See figure 5.) consists basically of a housing assembly with a cover at each end. The housing and covers are separated by two diaphragms: an up rate diaphragm and a down rate diaphragm. This forms three chambers: the up rate chamber, down rate chamber, and the rate reference chamber. As normal pressurization is initiated, the regulated vacuum is metered through the metering valve in the up rate chamber. The metering valve, being spring-loaded open, will start to close as the pressure decreases in the up rate chamber. Control pressure metered through the rate selector to the rate reference chamber will stabilize the position of the up rate metering valve, allowing the regulated vacuum to be metered at a selected rate. The rate of vacuum metered into the up rate chamber can be varied by the selection of the rate controller. The reduced control pressure is also sensed in the down rate chamber, and the down rate needle valve opens and meters cabin pressure directly to the vacuum source.



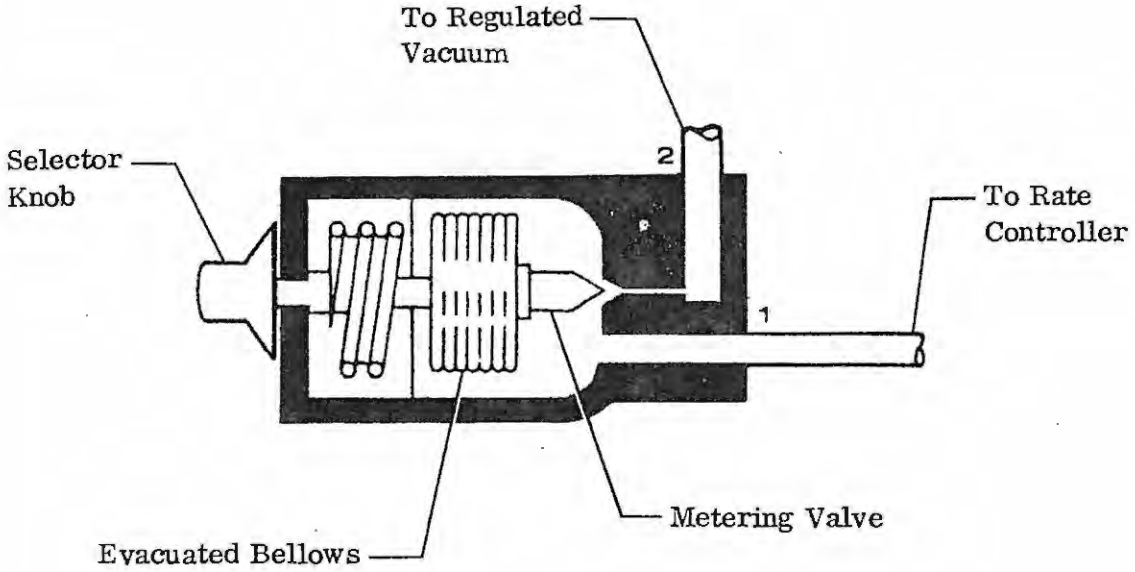
Aircraft 25-061, 25-070 thru 25-190 and 25-192



Aircraft 25-191, 25-193 thru 25-226

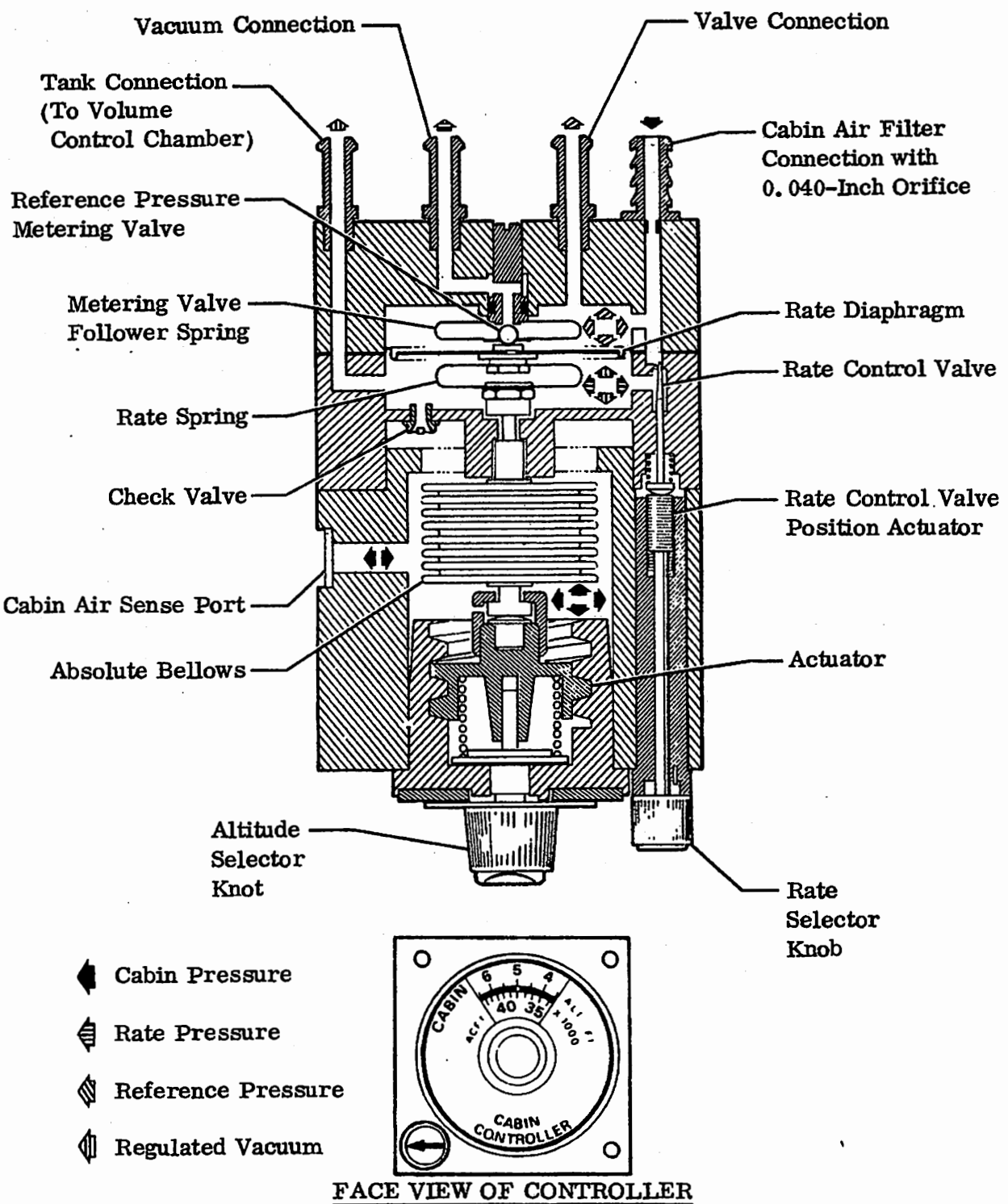
Rate Controller Schematic
Figure 5

(c) The cabin altitude controller (Aircraft 25-061, 25-070 thru 25-226) (See figure 6.) consists of an evacuated bellows connected to a metering valve. The metering valve controls the amount of vacuum metered to the rate controller. As the cabin pressure increases, the evacuated bellows contracts, bypassing more vacuum to the rate controller.



Cabin Altitude Controller Schematic
Figure 6

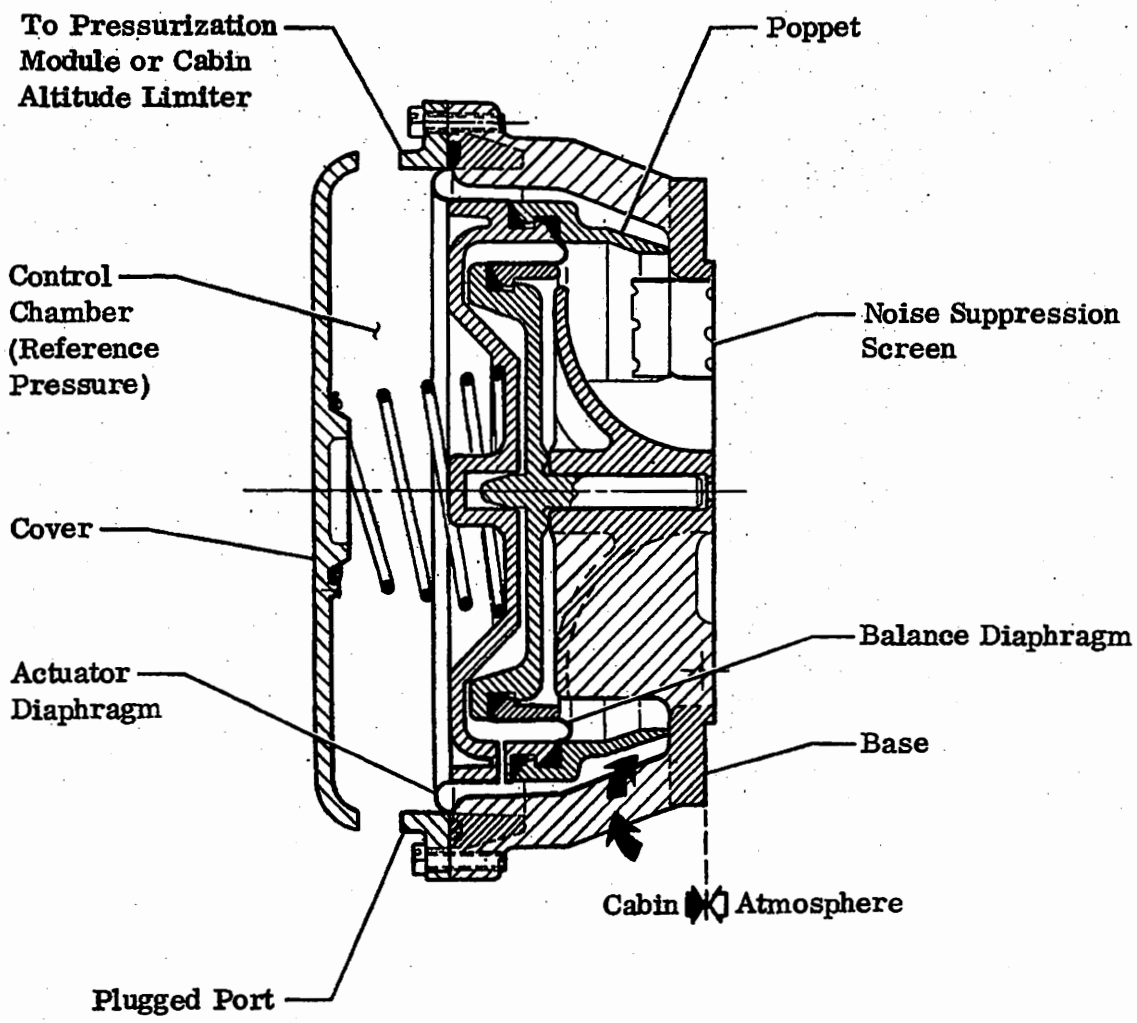
(d) The cabin pressure controller (mini-controller) (Aircraft 25-227 and Subsequent) (See figure 7.) provides a pneumatic signal to the cabin air exhaust control valve to control cabin altitude and rate-of-change. Any increase in cabin altitude is sensed by the absolute bellows in the cabin pressure controller (mini-controller) which expands slightly to reposition the reference pressure metering valve. The new position of the metering valve will restrict the flow of reference pressure, allowing the cabin air exhaust control valve to modulate toward the closed position. Any decrease in cabin altitude will contract the absolute bellows which will slightly reposition the reference pressure metering valve. The new position of the metering valve will increase the flow of reference pressure and cause the cabin air exhaust control valve to modulate toward the open position. If the flight plan requires an increase in aircraft altitude during cruise which would produce a cabin-to-atmosphere differential pressure, greater than normal isobaric differential pressure, the cabin pressure controller (mini-controller) setting should be changed. The altitude selector knob should be repositioned so that AIRCRAFT ALT indicates the new cruise altitude to preclude the possibility of unscheduled differential pressure control. Upon reselection to a higher altitude, the absolute bellows and reference pressure metering valve are repositioned to change reference pressure; therefore, the cabin air exhaust control valve is repositioned. The change in cabin pressure is continuously sensed to expand or contract the absolute bellows to control the flow of cabin air through the cabin air filter with orifice to regulated vacuum. This will change the reference pressure and modulate the cabin air exhaust control valve to maintain the selected cabin altitude. The descent rate-of-change control of cabin pressure is achieved by the speed at which reference pressure in the cabin pressure controller (mini-controller) flows through the rate control valve into the rate pressure chamber. The ascent rate-of-change control is the reverse flow, or when the rate pressure flows through the rate control valve into the reference chamber. When the differential pressure across the rate diaphragm is approximately equal, the reference pressure and the rate pressure are essentially constant. Reference pressure is sensed in the control chamber of the cabin air exhaust control valve which positions the valve and allows cabin altitude to stabilize at the selected cabin settings. As long as an unbalanced differential pressure exists across the rate diaphragm in the controller, the system will remain on rate-of-change control.



FACE VIEW OF CONTROLLER

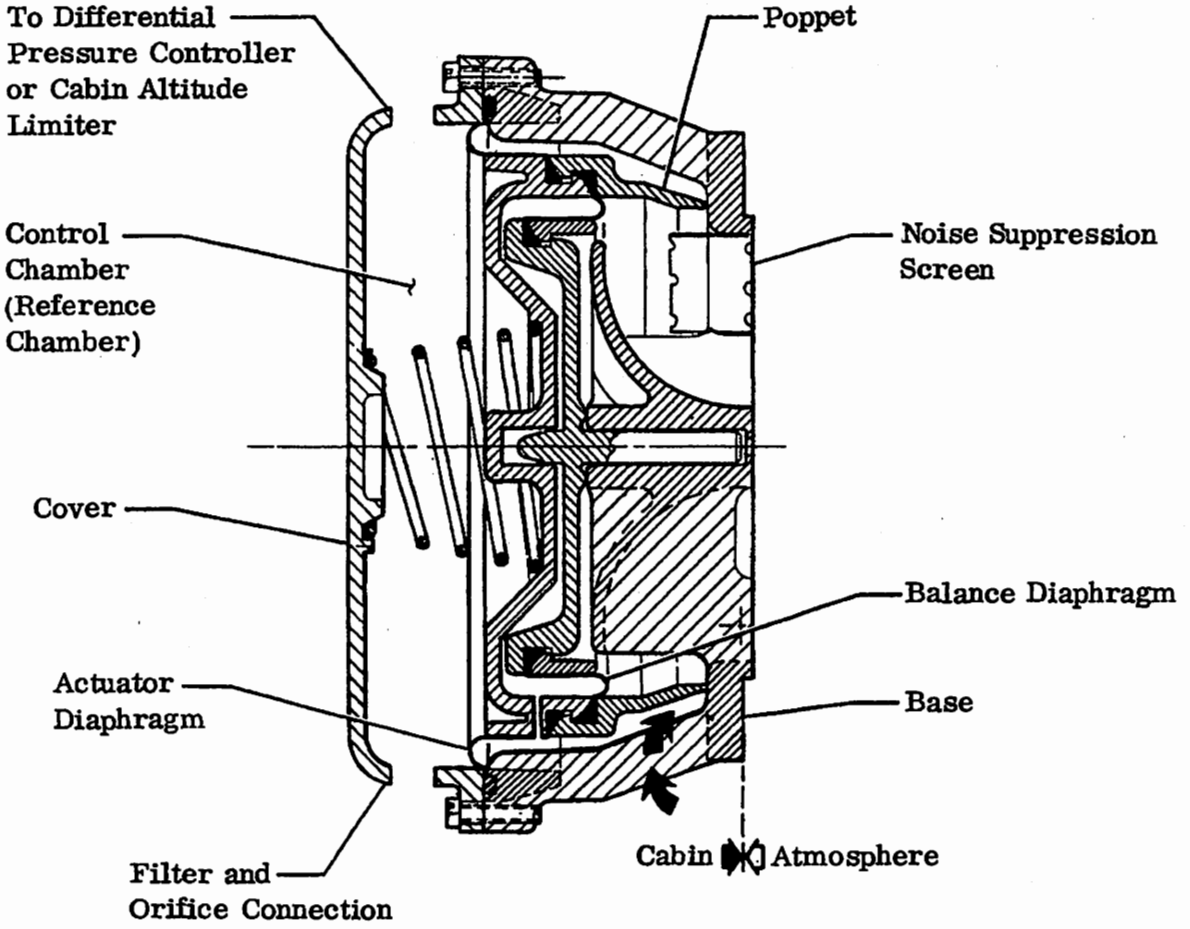
Cabin Pressure Controller (Mini-Controller) Schematic
Figure 7

(2) The cabin air exhaust control valve (See figure 3.) modulates the amount of air flow from the cabin to ambient, and is the primary source of cabin air discharge. During normal operation the control pressure applied to the cabin air exhaust control valve by the rate controller is less than the cabin pressure admitted through the filter. This creates a pressure unbalance between the control chamber and the balance chamber and causes the cabin air exhaust control valve to maintain the selected cabin altitude.



Cabin Air Exhaust Control Valve Schematic
Figure 8

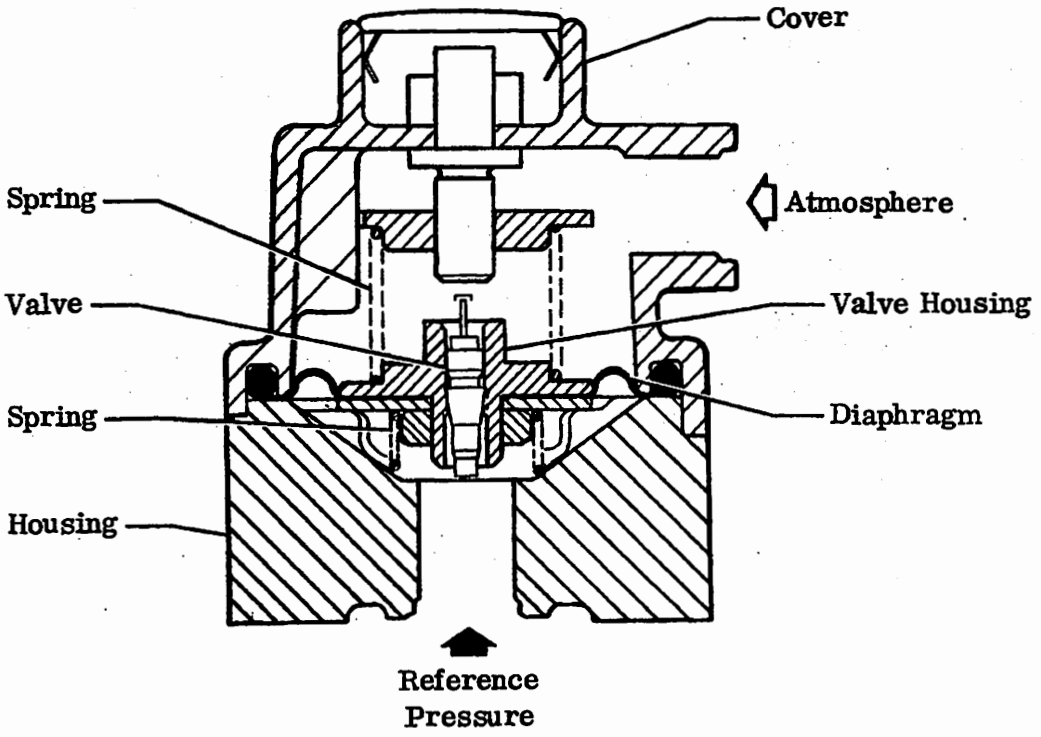
(3) The cabin safety valve (See figure 9.) is the secondary source of cabin air discharge to ambient, should the normal pressurization system malfunction and fail to maintain the selected cabin altitude. Cabin pressure admitted through the orificed filter balances the pressure in the balance chamber and is held closed by the spring-balanced poppet. The cabin safety valve, controlled by differential pressure controller and cabin altitude limiter, is entirely separate from the cabin altitude controller and provides safety relief only. In case of normal pressurization malfunction, the cabin safety valve provides the following safety functions. Should cabin differential pressure exceed 9.2 (±0.1) psi on Aircraft 25-061, 25-070 thru 25-266 or 9.7 (±0.1) psi on Aircraft 25-227 and Subsequent, the differential pressure controller will open. The open differential pressure controller will vent safety valve control chamber pressure, causing a pressure unbalance between the control chamber and balance chamber. This unbalance opens the cabin safety valve which vents cabin pressure to ambient.



Cabin Safety Valve Schematic
Figure 9.

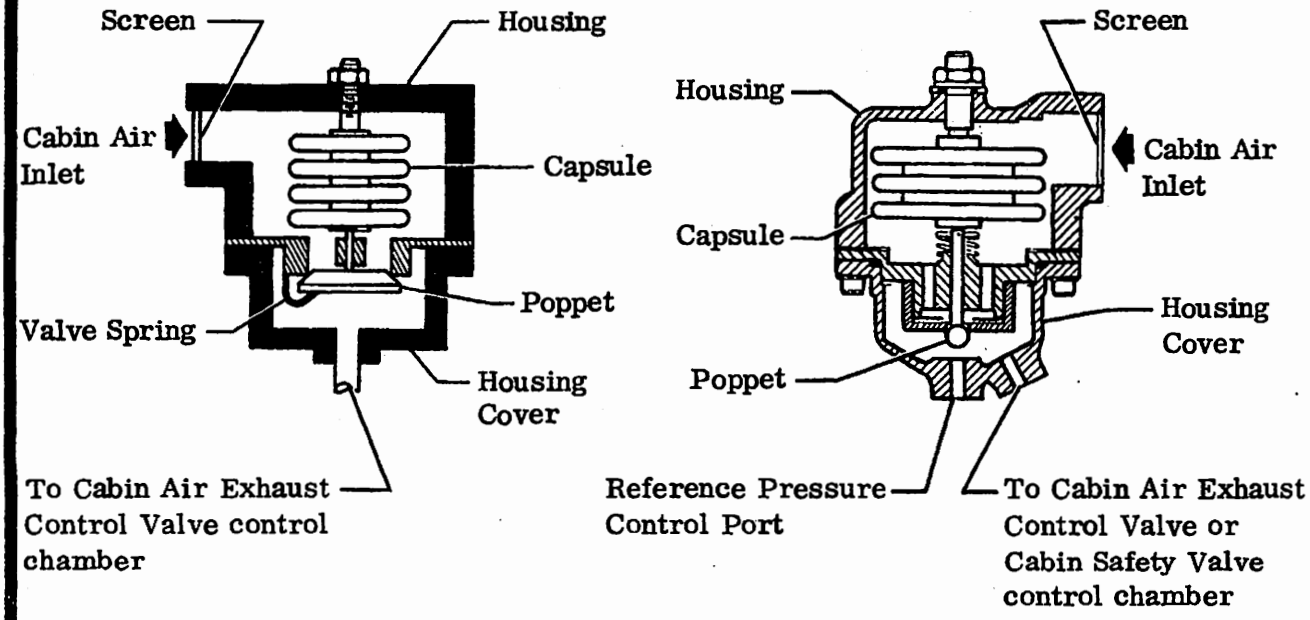
(4) The cabin differential pressure controllers (See figure 10.) open their appropriate control valve, venting excess pressure to ambient when the cabin-to-atmosphere differential pressure becomes too great. The cabin air exhaust control valve differential pressure controller is plumbed to ambient and reference pressure. When cabin pressure reaches the differential pressure setting of the controller (8.9 (±0.15) psi Aircraft 25-061, 25-070 thru 25-226) or 9.4 (±0.15) psi Aircraft 25-227 and Subsequent), the diaphragm moves off the metering valve and meters excess pressure to ambient.

Operation of the cabin safety valve differential pressure controller is the same except that one side is plumbed to the cabin safety valve control chamber and the other to ambient. The cabin safety valve differential pressure controller acts as a secondary controller and is set at (9.2 (±0.15) psi (Aircraft 25-061, 25-070 thru 25-226) or 9.7 (±0.15) psi (Aircraft 25-227 and Subsequent).



Cabin Differential Pressure Controller Schematic
Figure 10

(5) There are two cabin altitude limiters located in the aircraft. (See figure 11.) The forward cabin altitude limiter is located in the pressurization module on Aircraft 25-227 and Subsequent, and on the aft side of frame 5 on Aircraft 25-061, 25-070 thru 25-226, modified per AMK 78-5, Installation of Cabin Altitude Pressure Limiter. The aft cabin altitude limiter is located on frame 18 on 25B/D Aircraft and on frame 22 on 25C/F Aircraft. The cabin altitude limiters are used to sense cabin pressure and close the cabin air exhaust control valve or cabin safety valve, should the differential pressure controllers fail to maintain the appropriate cabin-to-atmosphere differential pressure and allow the cabin altitude to continue to rise above 11,000 (±1,000) feet (Aircraft 25-061, 25-070 thru 25-226) or 11,500 (±1,500) feet (Aircraft 25-227 and Subsequent). As cabin altitude rises, the decrease in cabin pressure is sensed by the evacuated capsules in the cabin altitude limiters. When the cabin altitude reaches approximately 11,000 (±1,000) or 11,500 (±1,500) feet, the evacuated capsules will expand, opening the poppets and allowing air at cabin pressure to flow into the control chambers of the cabin air exhaust control valve and the cabin safety valve. This increase in control chamber pressure will cause the cabin air exhaust control valve and cabin safety valves to close, maintaining a cabin altitude of approximately 11,000 (±1,000) or 11,500 (±1,500) feet.

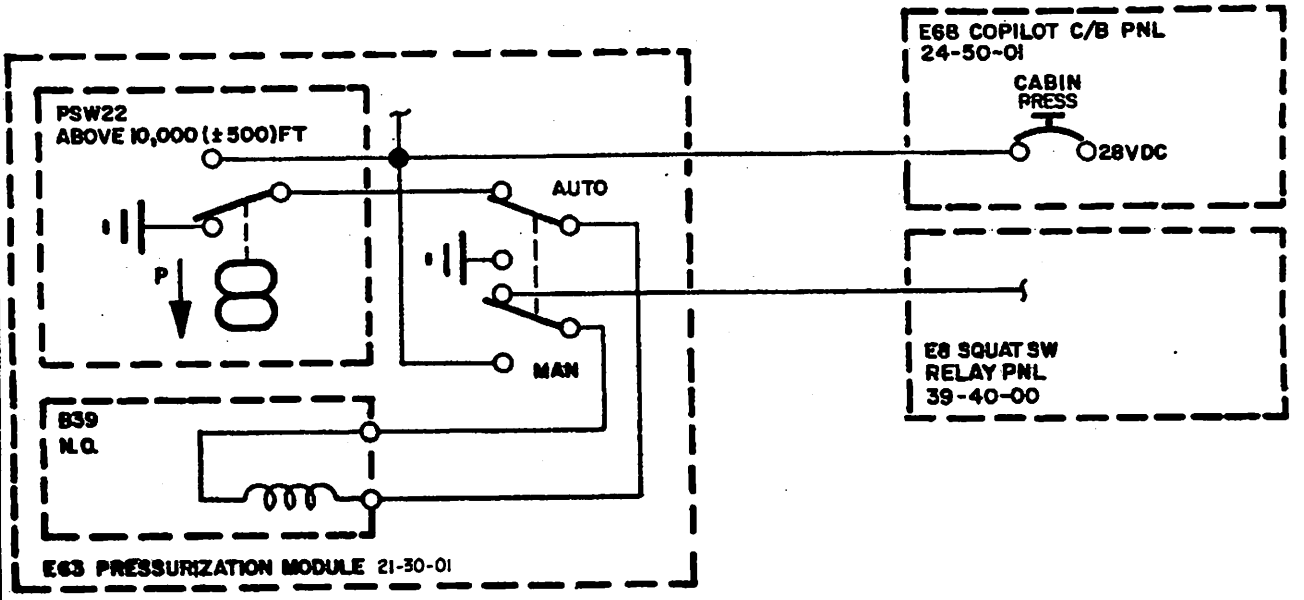


Aircraft 25-061, 25-070 thru 25-226 (Aft altitude limiter only)

Aircraft 25-227 and Subsequent and prior aircraft Modified per AMK 78-5 (Installation of Cabin Altitude Pressure Limiter)

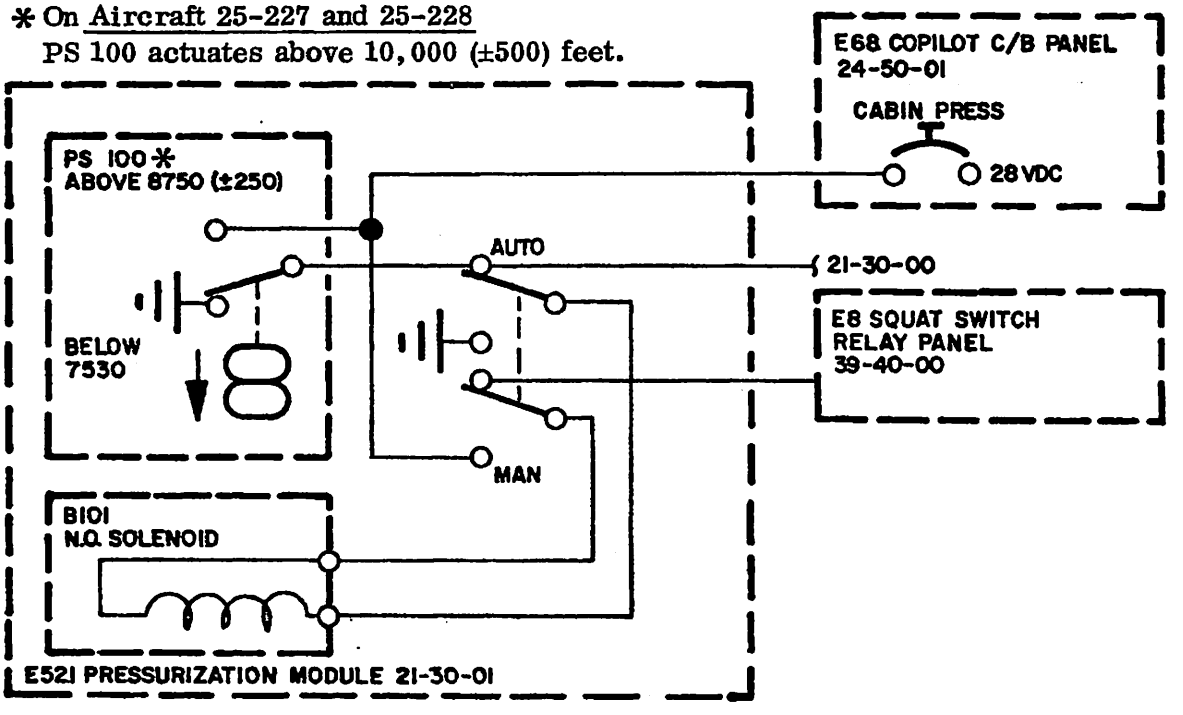
Cabin Altitude Limiter Schematic
Figure 11

(6) Aneroid switches are used to sense cabin depressurization. (See figure 12.) On Aircraft 25-061, 25-070 thru 25-226, if the cabin altitude should increase to 10,000 (±500) feet, the aneroid switch located in the pressurization module, completes a power circuit to the normally open solenoid valve. The solenoid is electrically held closed, isolating the cabin air exhaust control valve and preventing further decrease of cabin pressure. As cabin altitude decreases, the aneroid switch opens on or before 7,500 feet. When the aneroid switch opens the power circuit, the solenoid is allowed to return to its normally open position. On Aircraft 25-227 and Subsequent, two aneroid switches are located in the pressurization module. If the cabin altitude should increase to 8,750 (±250) feet or 10,000 (±500) feet (On Aircraft 25-227 and 25-228), the first aneroid switch completes a power circuit to the normally open solenoid valve. The solenoid is electrically held closed, isolating the cabin air exhaust control valve and preventing further decrease of cabin pressure. A CAB ALT caution light on the glareshield will illuminate. If cabin altitude exceeds 10,100 (±250) feet or 10,000 (±500) feet (On Aircraft 25-227 and 25-228), a second aneroid switch (aural warning) will actuate and sound a warning horn (Refer to 2.H (7).). As cabin altitude returns to 8,580 feet and 7,530 feet, respectively, or lower, the aneroid switches will return to their normal position, and the system will return to normal operation. On Aircraft 25-227 and Subsequent, the emergency pressurization aneroid switches are set to actuate at 9,500 (±250) feet of cabin altitude. The aneroid senses cabin depressurization and automatically switches the emergency pressurization valve to the emergency position. During normal operation, the aneroid switches provide a ground circuit through the modulating valve control and warning box to the emergency pressurization valve. If the aneroid switches are actuated, the ground circuit is opened and automatically provides emergency pressurization to the cabin.



Cabin Air Exhaust Control Valve Aneroid Switch

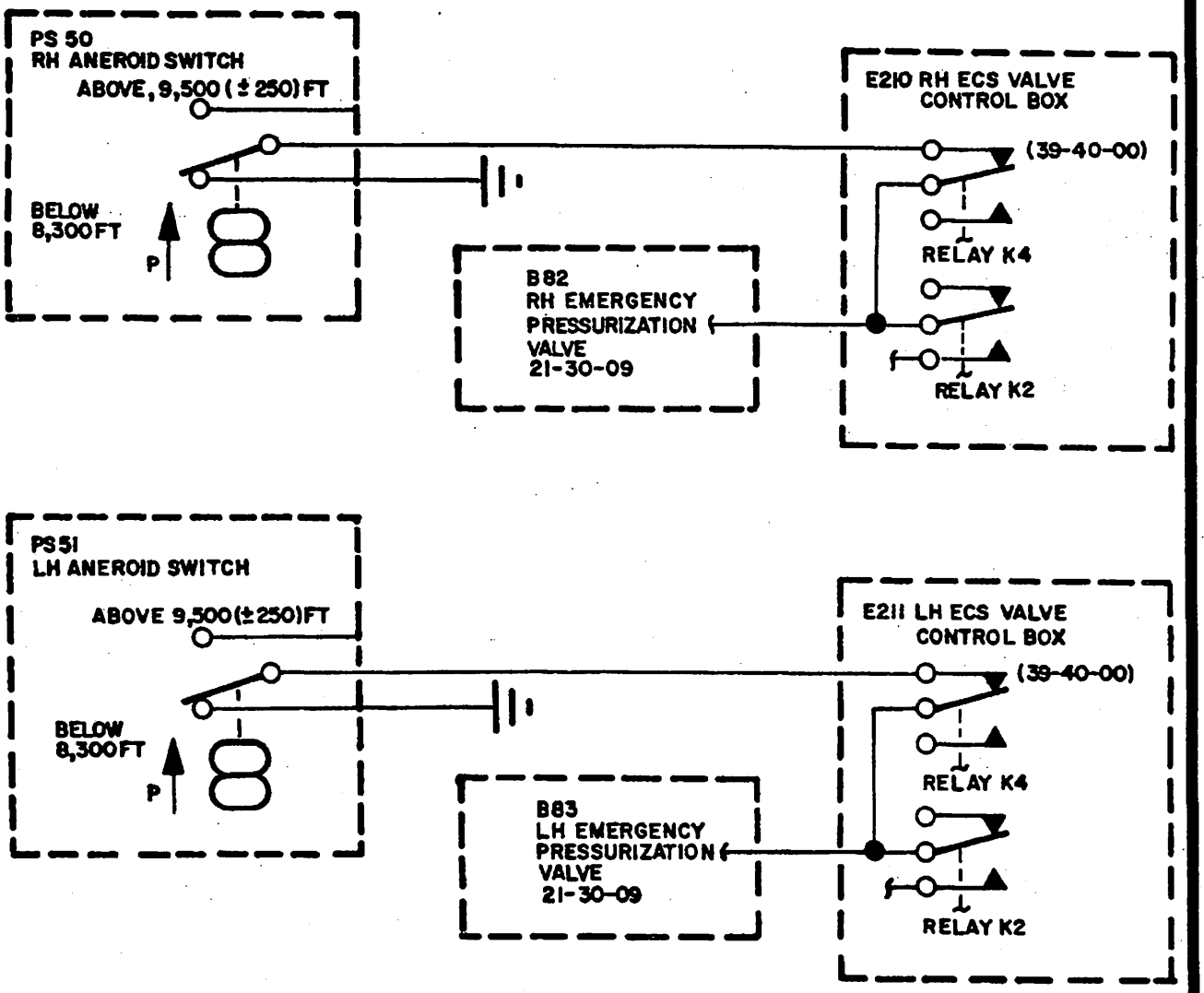
Aircraft 25-061, 25-070 thru 25-226



Cabin Air Exhaust Control Valve Aneroid Switch

Aircraft 25-227 and Subsequent

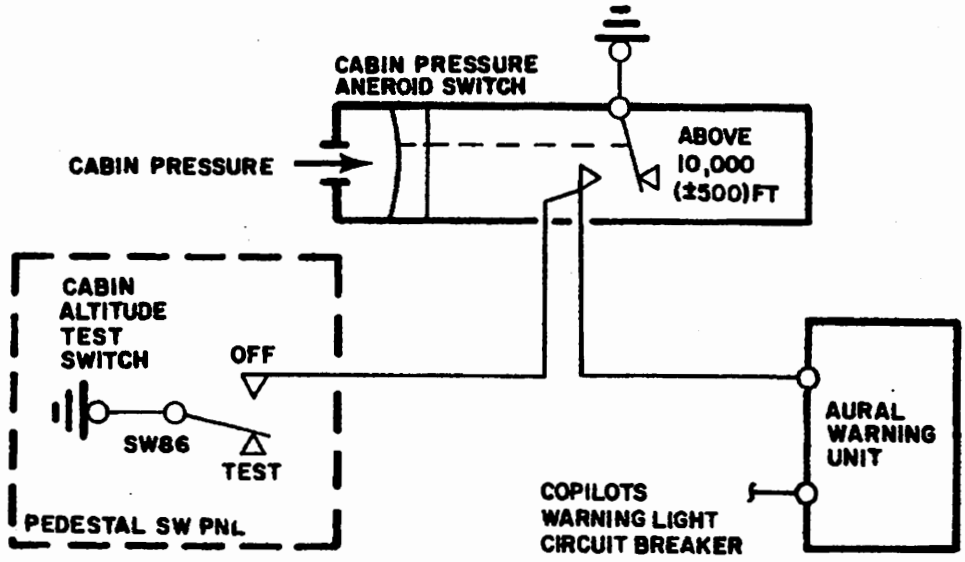
Pressurization Aneroid Switch Electrical Control Schematic
Figure 12 (Sheet 1 of 2)



Emergency Pressurization Aneroid Switches

Pressurization Aneroid Switch Electrical Control Schematic
Figure 12 (Sheet 2 of 2)

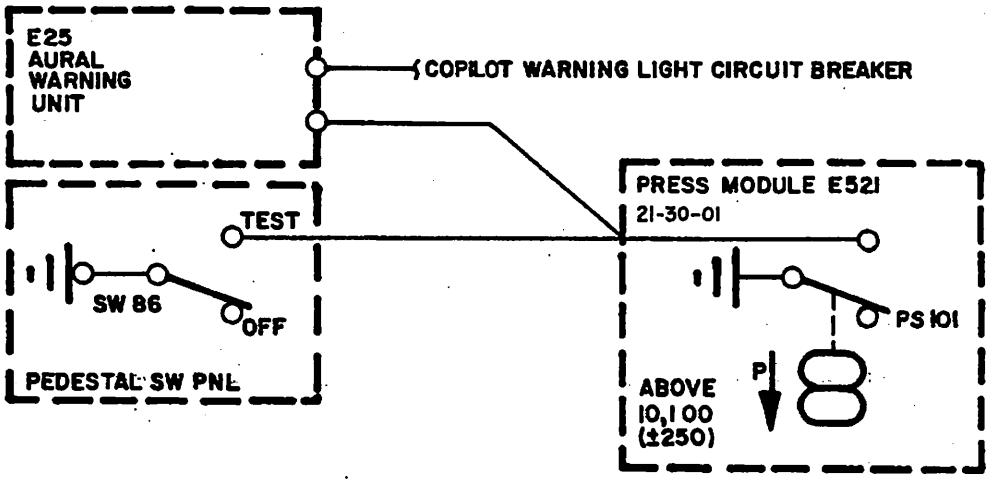
(7) The cabin pressure warning system (See figure 13.) consists of aural warning and a CAB ALT caution light. On Aircraft 25-061, 25-070 thru 26-226, if the cabin altitude reaches 10,000 (±500) feet, the aneroid switch completes a ground circuit to the aural warning unit. A CAB ALT TEST Switch, located on the pedestal switch panel, is used to test the aural warning circuit prior to takeoff. On Aircraft 25-227 and Subsequent, if the cabin altitude reaches 10,100 (±250) feet, the aneroid switch completes a ground circuit to the aural warning unit. A CAB ALT TEST Switch, located on the pedestal switch panel, is used to test the aural warning circuit prior to takeoff. On Aircraft 25-227 and Subsequent, the aneroid switch controlling the cabin air exhaust control valve, completes a power circuit to a relay in the squat switch relay panel. When the relay energizes, a ground circuit is completed to illuminate the CAB ALT caution light.



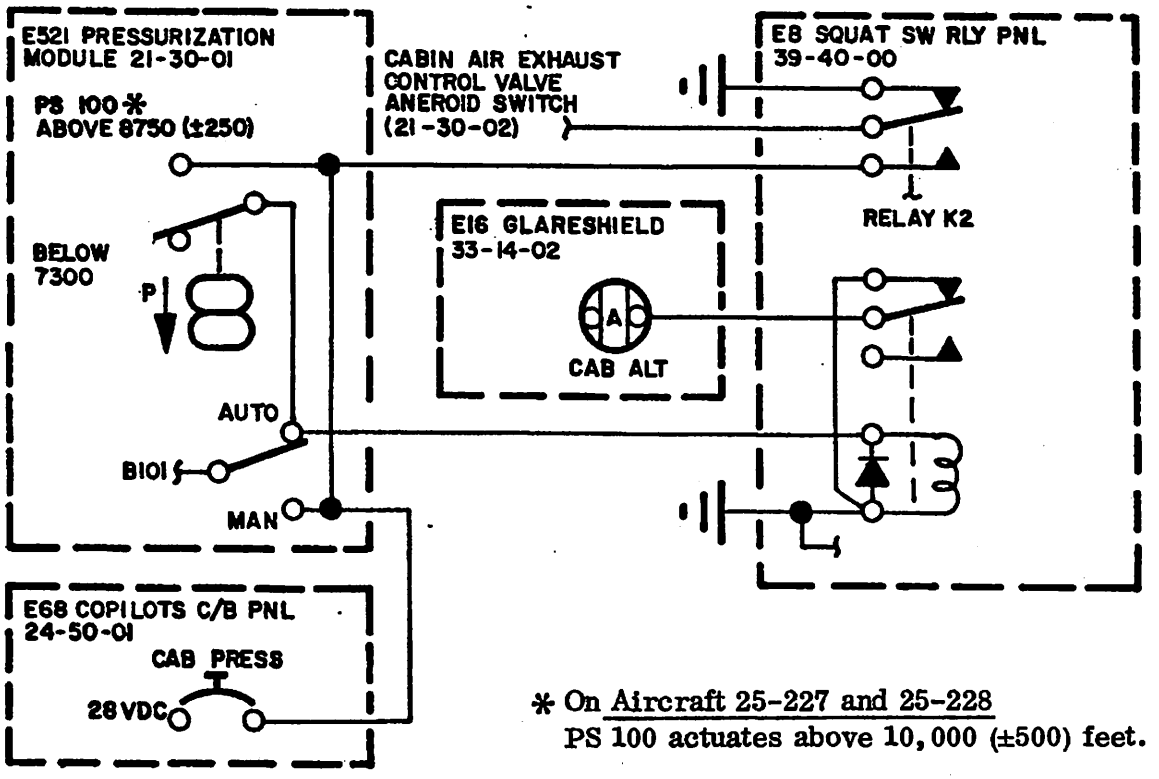
Cabin Aural Warning Electrical Schematic

Aircraft 25-061, 25-070 thru 25-226

Cabin Pressure Warning System Electrical Control Schematic
Figure 13 (Sheet 1 of 2)



Cabin Aural Warning Electrical Schematic



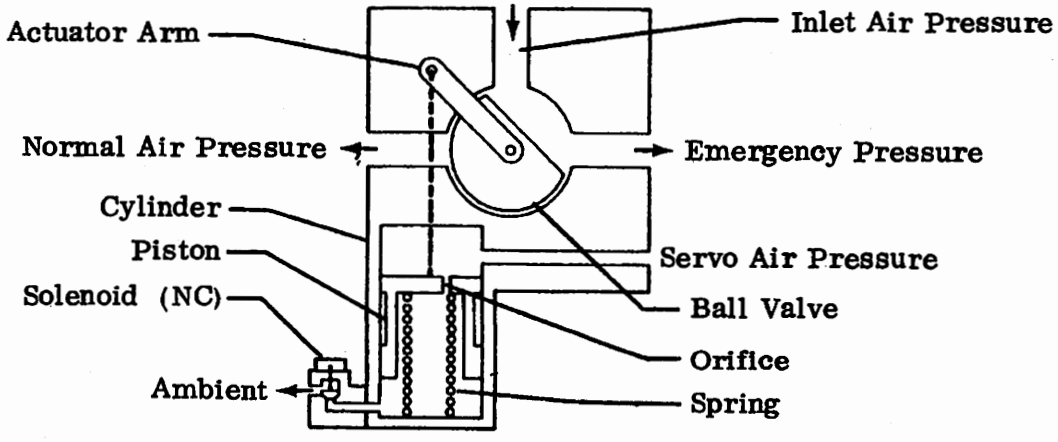
* On Aircraft 25-227 and 25-228
PS 100 actuates above 10,000 (±500) feet.

Cabin Altitude Caution Light Electrical Schematic

Cabin Pressure Warning System Electrical Control Schematic
Figure 13 (Sheet 2 of 2)

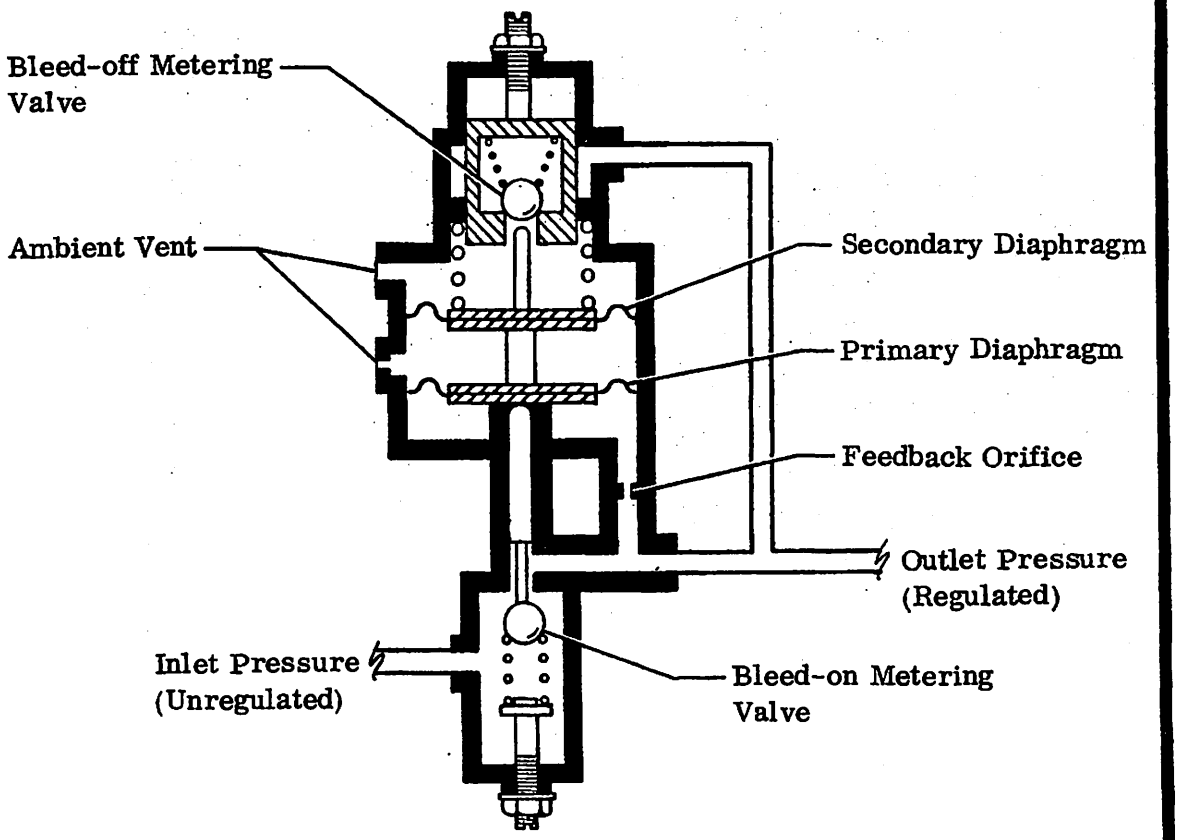
(8) On Aircraft 25-227 and Subsequent a (n.c.) vacuum shutoff solenoid valve is installed between the regulated vacuum line and the cabin safety valve (21-30-03). The solenoid is electrically opened when the Cabin Air Switch is set to OFF and remains open for approximately 15 seconds after the Cabin Air Switch is set to ON. When the solenoid is open, pressure in the cabin safety valve control chamber is reduced to below the pressure of the cabin. When this happens, the cabin safety valve opens and allows the cabin pressure to be vented to ambient.

(9) On Aircraft 25-227 and Subsequent, two emergency pressurization valves (See figure 14.) are installed to provide the aircraft with emergency pressurization should the normal pressurization system fail to maintain a cabin altitude below 9,500 (±250) feet. When one engine is started, bleed air pressure builds up in the piston chamber and is bled into the cylinder chamber through a small hole in the top of the piston until the air pressure on both sides of the piston is equal. A solenoid in the cylinder chamber is energized to the open position and vents the cylinder chamber pressure to ambient. The air pressure at the top of the piston overcomes the spring pressure and drives the piston down until it hits its internal stop. As the piston moves down, a yoke, attached to the piston and to the actuating arm on the ball valve, positions the ball valve for bleed air pressure to the normal pressure outlet port. When the Bleed Air Switches are set to EMER or if an electrical failure should occur, the solenoid closes. This blocks the bleed path for the cylinder pressure. The cylinder pressure increases until a balanced condition is reached. Spring pressure will then drive the piston up and position the ball valve to direct bleed air pressure through the emergency outlet.



Emergency Pressurization Valve Schematic
Figure 14

(10) On Aircraft 25-227 and Subsequent, a pressure regulator (See figure 15.) is installed in the tailcone equipment section. Unregulated bleed air pressure is ported through the bleed-on metering valve into the system. The air pressure increase sensed in the diaphragm control chamber, moves the diaphragm off the spring loaded metering valve and allows the metering valve to modulate the air pressure. If the regulated pressure should exceed the pre-set pressure, the bleed-on regulator will close, and the bleed-off regulator will move to bleed off the excess pressure to ambient. The pressure regulator incorporates a secondary backup diaphragm.



Pressure Regulator Schematic
Figure 15

PRESSURIZATION CONTROL - TROUBLE SHOOTING

1. Tools and Equipment

NAME	MANUFACTURER	USE
Vacuum Gage (0 to 100 inches of H_2O)	Commercially Available	To check vacuum of jet pump (vacuum regulator).

2. Trouble Shooting

TROUBLE	EXISTING CONDITION	PROBABLE CAUSE	TROUBLE SHOOTING REF
1. Excessive Ground Pressure Bump.	1. When bleed air is turned on.	1. Normally closed solenoid in vacuum line failed closed.	1. None. (Refer to functional test of pressurization module.)
		2. Exhaust control valve malfunctioned.	2. Reference "Regulated vacuum too low, jet pump (vacuum regulator) plugged, or flow restrictions in vacuum line" (Sheet 3 of 6).
		3. Regulated vacuum line leakage.	3. Reference "Regulated vacuum line leakage" (Sheet 4 of 6)
		4. Jet pump (vacuum regulator) plugged - low vacuum.	4. Reference "Regulated vacuum too low, jet pump (vacuum regulator) plugged, or flow restrictions in vacuum line" (Sheet 3 of 6).
		5. Electrical circuit malfunctioned.	5. None. (Perform continuity check of wiring.

Pressurization System Trouble Shooting
Figure 101 (Sheet 1 of 6)

TROUBLE	EXISTING CONDITION	PROBABLE CAUSE	TROUBLE SHOOTING REF
2. Cabin dives, will not rate up automatically.	1. During flight when altitude controller is set above ambient altitude. 2. During ground check with altitude controller set above field elevation.	1. Regulated vacuum line leakage. 2. Jet pump (vacuum regulator) plugged - low vacuum. 3. Malfunction within pressurization module. 4. Flow control valve full open.	1. Reference "Regulated vacuum line leakage" (Sheet 4 of 6). 2. Reference "Regulated vacuum too low, jet pump (vacuum regulator) plugged, or flow restrictions in vacuum line" (Sheet 3 of 6). 3. None. (Refer to functional test of pressurization module.) 4. Reference "Flow control valve in full open position" (Sheet 3 of 6).
3. Cabin altitude climbs with aircraft altitude.	1. Normal flight conditions.	1. Flow control valve closes at high inlet pressures. 2. Regulated vacuum too high. 3. Pressurization module malfunctioned. 4. Malfunction of cabin safety system.	1. Reference "Flow control valve closes at high inlet pressures" (Sheet 6 of 6). 2. Reference "Regulated vacuum too high" (Sheet 5 of 6). 3. None. (Refer to functional test of pressurization module.) 4. None. (Refer to functional test of pressurization system.)
4. Cabin will not maintain differential pressure at normal cruise power.	1. Aircraft in flight at altitudes up to 45,000 ft.	1. Insufficient air flow into cabin. 2. Obstructions under cabin safety valve poppet seat. 3. Regulated vacuum too high. 4. Pressurization module malfunctioned. 5. Excessive cabin leakage.	1. Reference "Insufficient air flow into cabin" (Sheet 6 of 6). 2. None. (Inspect cabin safety valve. Remove valve and clean poppet seat.) 3. Reference "Regulated vacuum too high" (Sheet 5 of 6). 4. None. (Refer to functional test of pressurization module.) 5. None.
5. System abnormally sluggish - slow response to inflow changes.		1. Regulated vacuum line leakage. 2. Regulated vacuum too low. 3. Pressurization module malfunctioned.	1. Reference "Regulated vacuum line leakage" (Sheet 4 of 6). 2. Reference "Regulated vacuum too low, jet pump (vacuum regulator) plugged, or flow restrictions in vacuum line" (Sheet 3 of 6). 3. None. (Refer to functional test of pressurization module.)
6. System instability - rate fluctuations.		1. Bleed air system malfunction. 2. Regulated vacuum line leakage. 3. Pressurization module malfunctioned.	1. None. (Refer to functional test of pressurization system.) 2. Reference "Regulated vacuum line leakage" (Sheet 4 of 6). 3. None. (Refer to functional test of pressurization module.)

Pressurization System Trouble Shooting
Figure 101 (Sheet 2 of 6)

REGULATED VACUUM TOO LOW, JET PUMP (VACUUM REGULATOR) PLUGGED, OR FLOW RESTRICTION IN VACUUM LINE. Conduct the following test:

1. Connect a vacuum gage (capable of measuring in inches of water) to vacuum line test port.
2. Start one engine. (Refer to FAA Approved Airplane Flight Manual for starting procedure.) Set Pressurization AUTO-MAN Switch to AUTO.
3. Set engine at 70% rpm. Check vacuum gage for 50 to 82-inches H_2O (on Aircraft equipped with a jet pump), and 44 to 65-inches H_2O (on Aircraft equipped with a vacuum regulator).
4. Check cabin air exhaust control valve is in full open position. IF

OK, malfunction has occurred within pressurization module. Remove and functional test module. Refer to 21-30-01.

NOT OK, disconnect vacuum line from test port tee (line to module) and cap tee. Retest system as outlined above. IF

OK, check for restrictions in vacuum line between module and test port.

NOT OK, remove and clean jet pump (vacuum regulator).

FLOW CONTROL VALVE IN FULL OPEN POSITION. Proceed as follows:

1. Set Cabin Air Switch to MAX. IF

Switch setting decreases airflow, MAX airflow solenoid is wired incorrectly. Refer to applicable wiring diagram and rewire solenoid.

Switch setting has no effect on airflow. Check for capped MAX flow solenoid and/or loose, broken, or kinked venturi sense lines. IF

OK, flow control valve is stuck in full open position. Remove and replace flow control valve.

NOT OK, remove cap if one was installed. Remove and replace sense lines if required.

Pressurization System Trouble Shooting
Figure 101 (Sheet 3 of 6)

REGULATED VACUUM LINE LEAKAGE.
Conduct the following test:

1. Connect vacuum side of pitot-static tester to frame 5 static port. Static port is located on forward side of frame 5 adjacent to cabin air exhaust control valve.
2. Block remaining static port.
3. Remove filter from pressurization module and cap fitting.
4. Rotate rate selector knob to full INCR.
5. Set altitude controller to maximum cabin altitude.
6. Block manual cabin altitude control valve to UP position.

CAUTION

Apply vacuum with pitot-static tester at a rate not to exceed 2,000 feet per minute or damage to rate controller diaphragm could result.

7. Apply a vacuum of 10,000 feet with pitot-static tester. Allow vacuum to stabilize and close valve on tester.
8. Altimeter should not decrease more than 500 fpm. IF

OK, decrease vacuum at a rate not to exceed 2,000 fpm. Disconnect pitot-static tester. Remove plug and install filter. Remove block from manual cabin altitude control valve and return rate selector and altitude controller to the original settings.

NOT OK, disconnect vacuum line from pressurization jet pump (vacuum regulator) and cap line. Retest system as outlined above.

Note

If system retest proves to be satisfactory, vacuum leakage is through pressurization jet pump (vacuum regulator) check valve. During normal operation, leakage through check valve will not cause any system malfunction; however, to eliminate possible trouble, pressurization jet pump (vacuum regulator) should be removed and cleaned. (Refer to Chapter 37.) IF

OK, decrease vacuum at a rate not to exceed 2,000 fpm. Disconnect pitot-static tester. Remove plug and install filter. Remove block from manual cabin altitude control valve and return rate selector and altitude controller to their original settings.

NOT OK, remove plug from vacuum line and connect line to pressurization jet pump (vacuum regulator). Lower pressurization module and disconnect vacuum line from module. Cap module and retest system. IF

Pressurization System Trouble Shooting
Figure 101 (Sheet 4 of 6)

OK (system retest proves satisfactory), vacuum leakage is between the pressurization jet pump (vacuum regulator) and the pressurization module assembly. Check line for leaks and fittings for security. Retest system as outlined above.

NOT OK, disconnect line from cabin air exhaust control and cap fitting. Retest system. IF

NOT OK, remove and functional test module. Refer to 21-30-01.

OK (system retest proves satisfactory), vacuum leakage is in cabin air exhaust control valve. Remove and replace valve.

REGULATED VACUUM TOO HIGH. Conduct the following test:

1. Connect a vacuum gage (capable of measuring in inches of water) to vacuum line test port.
2. Start one engine. (Refer to FAA Approved Airplane Flight Manual for starting procedure.) Set Pressurization AUTO-MAN Switch to AUTO.
3. Set engine at 70% rpm. Check vacuum gage for 50 to 82-inches H_2O (on Aircraft equipped with a jet pump), and 44 to 65-inches H_2O, (on Aircraft equipped with a vacuum regulator). IF

OK, malfunction has occurred within pressurization module. Remove and functional test module. Refer to 21-30-01.

NOT OK, check following items:

1. Remove and clean pressurization jet pump (vacuum regulator).
2. Check pressurization jet pump (vacuum regulator) filter.
3. Check lines between filter and jet pump (vacuum regulator) for leakage.
4. Retest system as outlined above.

Pressurization System Trouble Shooting
Figure 101 (Sheet 5 of 6)

FLOW CONTROL VALVE CLOSES AT HIGH INLET PRESSURES.

Note

If previous testing indicates no pressurization system malfunction, it is possible that insufficient airflow is entering cabin during first minutes of flight.

Perform the following test:

1. Apply 30 psig thru pressurization cart or operate engine at 70% rpm.
2. Apply soap solution to flow control sense lines and check for leakage. IF

OK, flow control valve may be faulty. Remove and replace flow control valve.

NOT OK, tighten sense lines. Retest system as outlined above.

INSUFFICIENT AIRFLOW INTO CABIN.

Note

In cases of this trouble, flight squawk will probably include insufficient cabin heat.

Proceed as follows:

1. If pressurization cart is used, remove either bleed air duct and connect pressurization cart.
2. If pressurization cart is not available, use one engine at 70% rpm.
3. Apply 30 psig thru cart or operate engine at 70% rpm.
4. Set Air Bleed switch to NORM and, using a soap solution, check flow control valve sense lines. IF

NOT OK, tighten sense lines and retest system.

OK, flow control may have malfunctioned. Remove and replace flow control valve. Retest system as outlined above.

Pressurization System Trouble Shooting
Figure 101 (Sheet 6 of 6)

3. Trouble Shooting Functional Test (25-061, 25-070 thru 25-226)

A. The following functional test procedure is provided as an aid in trouble shooting the cabin pressurization system and cabin leakage.

B. The aircraft shall be in flight configuration and pressurization system shall be completely installed.

NOTE: All drain holes and vents normally open during flight shall be left open during functional testing.

C. When performing any of the following functional tests, a data sheet (See figure 102.) should be utilized to record test data.

D. Tools and Equipment:

NOTE: The following tools and equipment or their equivalent are required in performing the following functional tests of the pressurization system.

NAME	PART NUMBER	MANUFACTURER	USE
Vacuum Gage (0-100 inches of H_2O)		Commercially Available	General
Compressed Air Source (filtered) with 0-30 psi gage (required only if engines are not run for functional test) and capable of 150 CFM at 40 psi.		Commercially Available	General
*Pitot-Static Tester	MB-1	Aircraft Products Co. Bridgeport, Pa.	General
*Pitot-Static Tester	1811F	Barfield Instrument Corp. Atlanta, Georgia	General
Cabin Pressurization Test Cart	B1737	Gates Learjet	General

*NOTE: This tester shall be sent to the instrument lab once each month for certification. The altimeter and airspeed indicator shall have essentially zero case leakage and shall be checked for accuracy. Instrument correction cards shall accompany test rig.

CAUTION:
- ENSURE THAT ALL MOISTURE IS DRAINED FROM RECEIVER TANK AND DESICCANT OF CABIN PRESSURIZATION TEST CART PRIOR TO AND WHILE CONNECTED TO AIRCRAFT TO PREVENT AIRCRAFT SYSTEM CONTAMINATION.
- PULL STAB HEAT CIRCUIT BREAKER WHILE PERFORMING FUNCTIONAL TEST.

E. Cabin Reference Line Leakage Test

(1) Remove filter from aft pressure bulkhead. Remove line from jet pump (vacuum regulator) and cap.

(2) Apply pressure to bulkhead fitting with pitot-static tester, sufficient to give an airspeed instrument reading of 450 knots. Turn off pressure, sealing system. System pressure drop in one minute shall not be enough to cause a one knot indication on airspeed indicator. Record reading on data sheet. (See figure 102.)

(3) Remove tester and re-install filter and line to jet pump (vacuum regulator), and restore system to normal.

F. System Leakage Test

(1) Conduct test with Battery Switches off.

(2) Remove filter from pressurization module and cap fitting.

(3) Select full increase on rate selector.

(4) Select maximum cabin altitude on altitude controller.

(5) Set pitot-static tester to sea level.

(6) Connect pitot-static tester to vacuum test port located on frame 22 (25B/D Aircraft) or on frame 18 (25C/F Aircraft), and gradually apply vacuum to 3,000 feet. It is permissible to remove vacuum line from jet pump (vacuum regulator) and cap line.

CAUTION: TO PREVENT DAMAGE TO RATE CONTROLLER DIAPHRAGMS, APPLY AND RELEASE VACUUM AT A RATE NOT TO EXCEED 1,000 FEET PER MINUTE (AT LEAST 3 FULL MINUTES TO APPLY 3,000 FEET OF VACUUM).

(7) Allow vacuum to stabilize, then close valve on tester to seal system. Tester altimeter reading shall not decrease more than 500 feet in one minute. Record reading on data sheet. (See figure 102.)

(8) Remove tester; reinstall filter in pressurization module. Reinstall vacuum line at jet pump (vacuum regulator) and restore system to normal.

G. Regulated Jet Pump Test

(1) Ground Mode

(a) Connect vacuum gage to regulated vacuum line test port located on frame 22 (25B/D Aircraft) or on frame 18 (25C/F Aircraft).

(b) Instrument panel Cabin Air Switch shall be set to OFF. Battery Switches shall be on, and SQUAT SW circuit breaker shall be depressed.

(c) Supply bleed air to jet pump (vacuum regulator) by running one engine or by connecting compressed air source to bleed air manifold.

(d) Increase engine RPM until vacuum gage indication ceases to change and remains stable or increase compressed air pressure to 15 psig.

(e) Record vacuum gage reading on data sheet. (See figure 102.) This is normal operating vacuum in ground mode.

(f) Observe cabin air exhaust control valve position and record on data sheet. The cabin air exhaust control valve shall be fully open.

(g) Observe that cabin safety valve is fully closed.

(2) Flight Mode

(a) Set Pressurization AUTO-MAN Switch to AUTO. Select maximum altitude on altitude controller and maximum rate on rate selector. Pull SQUAT SW circuit breaker to simulate flight mode. Increase engine RPM or compressed air pressure until vacuum gage indication ceases to change and remains stable. This is pressure required to produce regulated vacuum in flight mode. Record RPM or pressure on data sheet (See figure 102.). RPM or pressure shall be within tolerance shown on data sheet.

(b) Record vacuum gage reading on data sheet. This is normal operating vacuum in flight mode. Reading shall be within tolerance shown on data sheet.

(c) Maintain a cabin altitude above field elevation on altitude controller. Cabin air exhaust control valve shall be open. Record cabin air exhaust control valve position on data sheet.

(d) Select MAN on Pressurization AUTO-MAN Switch. Cabin air exhaust control valve shall remain open. Record cabin air exhaust control valve position on data sheet.

(e) Select below-field elevation on altitude controller. Cabin air exhaust control valve shall remain open. Record cabin air exhaust control valve position on data sheet.

(f) Select UP on manual cabin altitude control valve. Cabin air exhaust control valve shall close. Record cabin air exhaust control valve position on data sheet.

(g) Select AUTO on Pressurization AUTO-MAN Switch. Select above-field elevation on altitude controller. Cabin air exhaust control valve shall open. Record cabin air exhaust control valve position on data sheet.

(h) Select MAN on Pressurization AUTO-MAN Switch. Select DOWN on manual cabin altitude control valve. Cabin air exhaust control valve shall close. Record cabin air exhaust control valve position on data sheet.

(i) Disconnect vacuum gage from test port, cap test port, and restore system to normal.

H. Pressurized Cabin Tests

(1) Ground Mode

(a) Connect cabin pressurization test cart to aircraft. (See figure 104.)

(b) Instrument panel Bleed Air Switch shall be set to NORM, Battery Switches shall be on, SQUAT SW circuit breaker shall be depressed, and Pressurization AUTO-MAN Switch shall be set to AUTO.

(c) Pressurize aircraft with authorized personnel in cabin. Supply bleed air to jet pump (vacuum regulator) by running one engine or by connecting compressed air source to bleed air manifold.

(d) Set engine RPM or compressed air pressure to about 40 psi inlet pressure.

(e) Observe cabin air exhaust control valve position and record on data sheet (See figure 102.). Cabin air exhaust control valve shall be open.

(f) Record test cart U-tube manometer reading of cabin pressure on data sheet. Reading shall be within tolerance shown on data sheet.

(g) Set Pressurization AUTO-MAN Switch from AUTO to MAN. Select various cabin altitudes on altitude controller and various rates on rate selector. There shall be no change in cabin pressure. Record results on data sheet.

(2) Flight Mode

(a) Pull SQUAT SW circuit breaker to simulate flight mode. Set Pressurization AUTO-MAN Switch to AUTO, set cabin pressure controller (mini-controller) to field pressure altitude. Select cabin altitude above field elevation on altitude controller. Observe cabin rate-of-climb indicator and record value on data sheet. Cabin rate-of-climb shall be within limits shown on data sheet. (See figure 102.)

NOTE: To determine field pressure altitude use copilot's flight altimeter, select 29.92 inches Hg. on the altimeter's barometer correction window. Altimeter will then indicate field pressure altitude.

(b) Select minimum rate (decrease) on rate selector. Select below sea level elevation on altitude controller. Observe cabin rate-of-climb indicator and record value on data sheet.

(c) Select maximum rate (increase) on rate selector. Observe cabin rate-of-climb indicator and record value on data sheet. Cabin rate-of-climb shall be within limits shown on data sheet.

NOTE: If maximum down rate cannot be achieved, energize maximum flow switch.

(d) Select field pressure altitude on altitude controller. Select minimum rate (decrease) on rate selector. Observe cabin rate-of-climb indicator and record reading on data sheet. Select maximum rate (increase) on rate selector. Observe cabin rate-of-climb indicator and record reading on data sheet. Cabin rate-of-climb shall be within limits shown on data sheet. Note that increase in rate is smooth and linear. Select a nominal rate (approximately 500 feet/minute) on rate selector. Allow cabin altitude to stabilize and rate-of-climb indicator to reach zero. Record cabin altitude on data sheet.

(e) Depress SQUAT SW circuit breaker, and record rate-of-climb on data sheet.

(f) Set Bleed Air Switch to OFF, and restore system to normal.

I. Cabin Leakage Test

(1) Plug cabin inlet port of aircraft differential pressure gage.

(2) Disconnect vacuum line at jet pump (vacuum regulator) in tailcone. Cap disconnected line. Connect pneumatic test cart to port of flow control valve manifold.

(3) Set Battery Switches off. Leave manual control valve in neutral position.

(4) Set rate selector to full increase. Set altitude controller to maximum altitude.

(5) Close and latch cabin door (cabin empty).

(6) Turn on pneumatic cart and slowly increase cabin pressure to 8.0 psig at a rate not to exceed 2000 feet per minute.

(7) Adjust cabin pressure cart regulator to maintain a 0 - rate stabilized cabin pressure at 8.0 psig. Read flow meter. Reading shall not exceed 130 SCFM. Record reading on data sheet. (See figure 102.) Block off bleed air check valve. In this case actual leakage shall not exceed 115 SCFM. Record reading on data sheet. Actual leakage shall be determined from measured leakage by applying correction per figure 105.

NOTE: Block off bleed air check valves at firewall pylon-to-engine connection.

(8) If leakage rate is greater than allowed in 3. H. (7), check cable seals, wire bundle seals, cabin door seal, etc., for excessive leaks.

WARNING: DO NOT SEAL HOLES THAT ARE NORMALLY OPEN DURING FLIGHT, SUCH AS DRAIN HOLES, VENTS, ETC.

(9) Depressurize and repair pressure seals that are leaking excessively.

WARNING: DO NOT OPEN CABIN DOOR WITH CABIN PRESSURIZED.

CAUTION: DEPRESSURIZE AT A RATE NOT TO EXCEED 3000 FEET PER MINUTE.

(10) Repeat pressurization and leak repair procedure until leakage rate meets requirements in step 3. H. (7).

(11) Restore system to normal.

J. Cabin Air Exhaust Control Valve and Cabin Safety Valve Tests

(1) With test setup same as step 3. H., slowly increase cabin pressure until cabin air exhaust control valve opens. Pressure shall be 8.60 to 9.00 psig. Record on data sheet pressure at which cabin air exhaust control valve opens. (See figure 102.) Cabin safety valve shall not open.

(2) Apply a pressure, not to exceed 1 psig to cabin air exhaust control valve static port.

(3) Slowly increase cabin pressure until cabin safety valve opens. Pressure shall be 9.00 to 9.30 psig.

WARNING: DO NOT EXCEED 9.45 PSIG. RECORD PRESSURE AT WHICH CABIN SAFETY VALVE OPENS ON DATA SHEET.

(4) Depressurize aircraft and restore system to normal.

WARNING: DO NOT OPEN CABIN DOOR WITH CABIN PRESSURIZED.

CAUTION: DEPRESSURIZE AT A RATE NOT TO EXCEED 3000 FEET PER MINUTE.

DATA SHEET

Para.	Test	Required	Actual
3.E.(2)	Cabin Reference Line	449 Kts. minimum after 1 minute	_____knots
3.F.(7)	System Leakage	2,500 feet after 1 minute	_____feet
3.G.(1)(d)	Required Air Pressure	_____% rpm or 15 psig	_____% rpm or _____psig
3.G.(1)(e)	Regulated Vacuum	Record only	_____inches H_2O
3.G.(1)(f)	Cabin Air Exhaust Control Valve	Full open	
3.G.(1)(g)	Cabin Safety Valve	Full Closed	
3.G.(2)(a)	Required Air Pressure	_____% rpm or 15 psig maximum	_____% rpm or _____psig
3.G.(2)(b)	Regulated Vacuum	50 to 82-inches H_2O (aircraft with jet pump) 44 to 65-inches H_2O (aircraft with vacuum regulator)	_____inches H_2O _____inches H_2O
3.G.(2)(c)	Cabin Air Exhaust Control Valve Position	Open	_____
3.G.(2)(d)	Cabin Air Exhaust Control Valve Position	Open	_____
3.G.(2)(e)	Cabin Air Exhaust Control Valve Position	Open	_____
3.G.(2)(f)	Cabin Air Exhaust Control Valve Position	Closed	_____
3.G.(2)(g)	Cabin Air Exhaust Control Valve Position	Open	_____
3.G.(2)(h)	Cabin Air Exhaust Control Valve Position	Closed	_____
3.H.(1)(e)	Cabin Air Exhaust Control Valve Position	Open	_____
3.H.(1)(f)	Ground Differential Pressure	7-inches H_2O max.	_____inches H_2O
3.H.(1)(g)	Manual Altitude Hold	0 feet (Change)	_____feet

Pressurization Control Trouble Shooting Data Sheet
Figure 102 (Sheet 1 of 2)

DATA SHEET

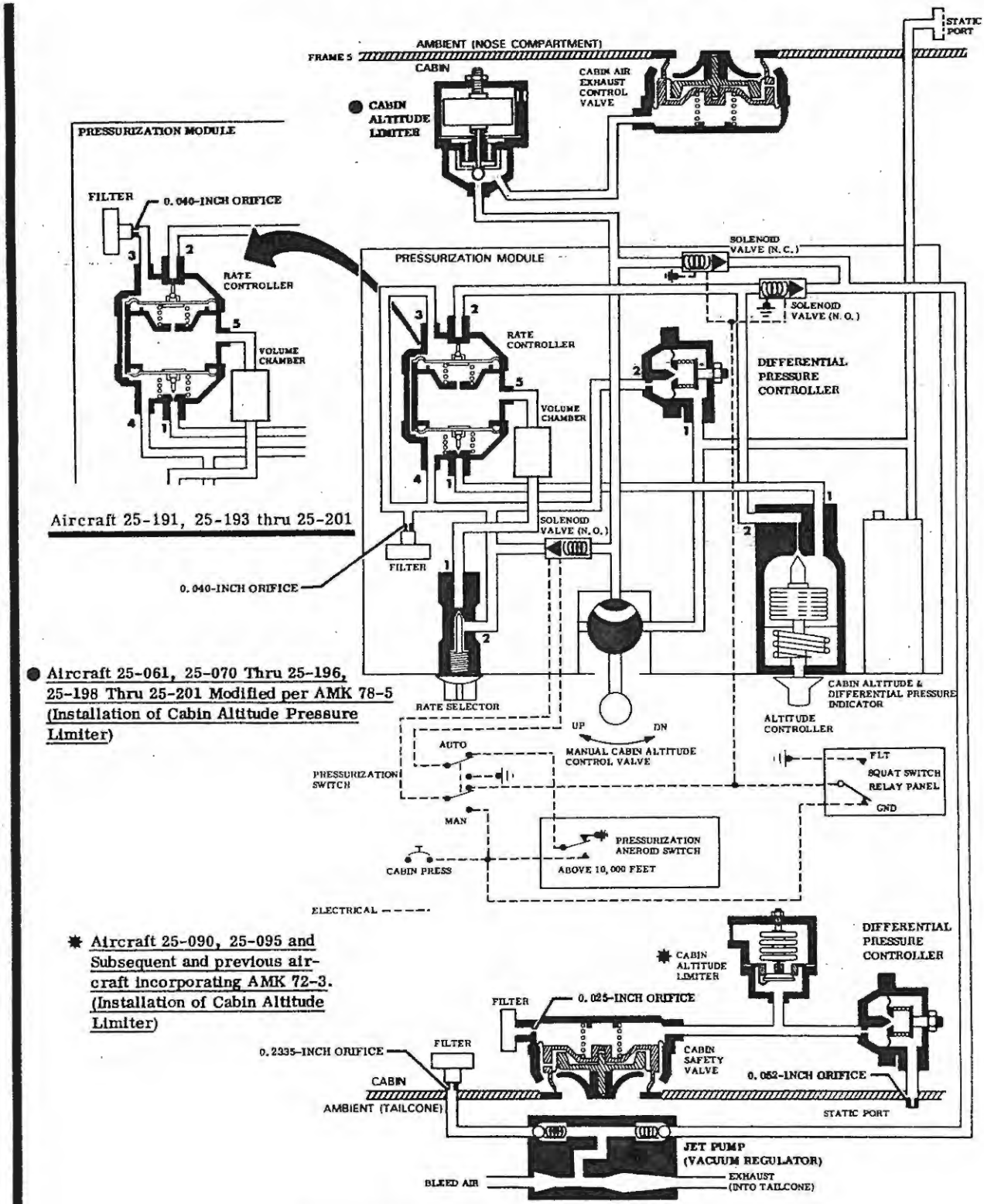
Para.	Test	Required	Actual
3.H.(2)(a)	Transition Bump Ground to Flight Mode	±100 fpm	_____ fpm
3.H.(2)(b)	Minimum Down Rate - Auto	Less than 400 fpm	_____ fpm
3.H.(2)(c)	Maximum Down Rate - Auto	In excess of 1200 fpm	_____ fpm
3.H.(2)(d)	Minimum Down Rate - Auto	Less than 400 fpm	_____ fpm
3.H.(2)(d)	Maximum Up Rate - Auto	In excess of 2100 fpm	_____ fpm
3.H.(2)(d)	Rate Controller (Isobaric Accuracy)	Smooth & Linear	_____
		Field Pressure Altitude ±500 feet	_____ feet
3.H.(2)(e)	Transition Bump - Landing (Flight to Ground Mode)	Less than 100 fpm	_____ fpm
3.I.(7)	Cabin Leakage	130 scfm maximum	_____ scfm
		115 scfm maximum (Bleed air check valves blocked off)	_____ scfm
3.J.(1)	Cabin Air Exhaust Control Valve, Differential Pressure Relief	8.60 to 9.00 psig	_____ psig
3.J.(3)	Cabin Safety Valve, Differential Pressure Relief	9.00 to 9.30 psig	_____ psig

AIRCRAFT S/N _____ INSPECTOR _____

PRESSURIZATION MODULE S/N _____ OBSERVER _____

CABIN PRESSURE CART _____ DATE _____

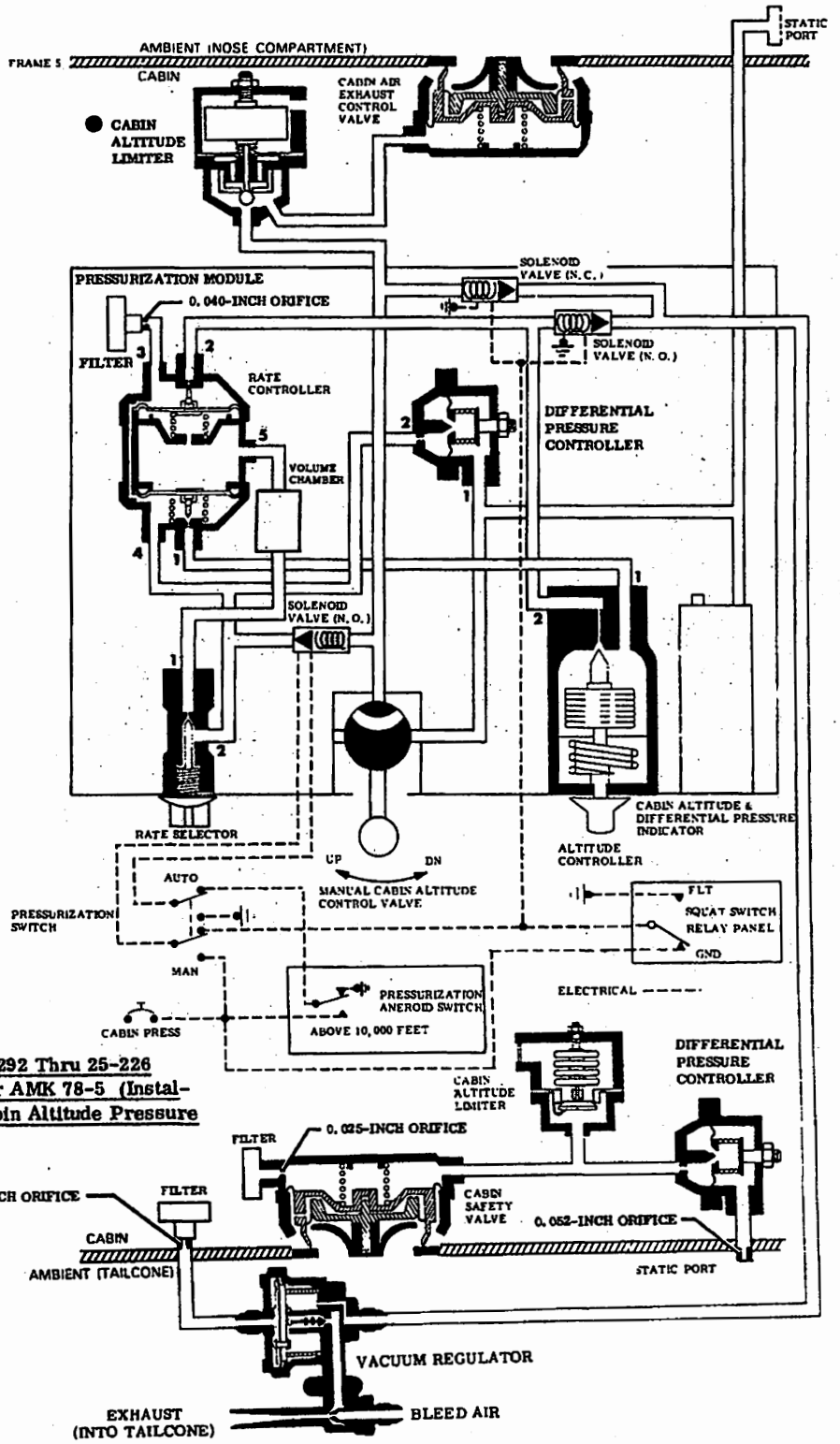
Pressurization Control Trouble Shooting Data Sheet
Figure 102 (Sheet 2 of 2)



● Aircraft 25-061, 25-070 Thru 25-196, 25-198 Thru 25-201 Modified per AMK 78-5 (Installation of Cabin Altitude Pressure Limiter)

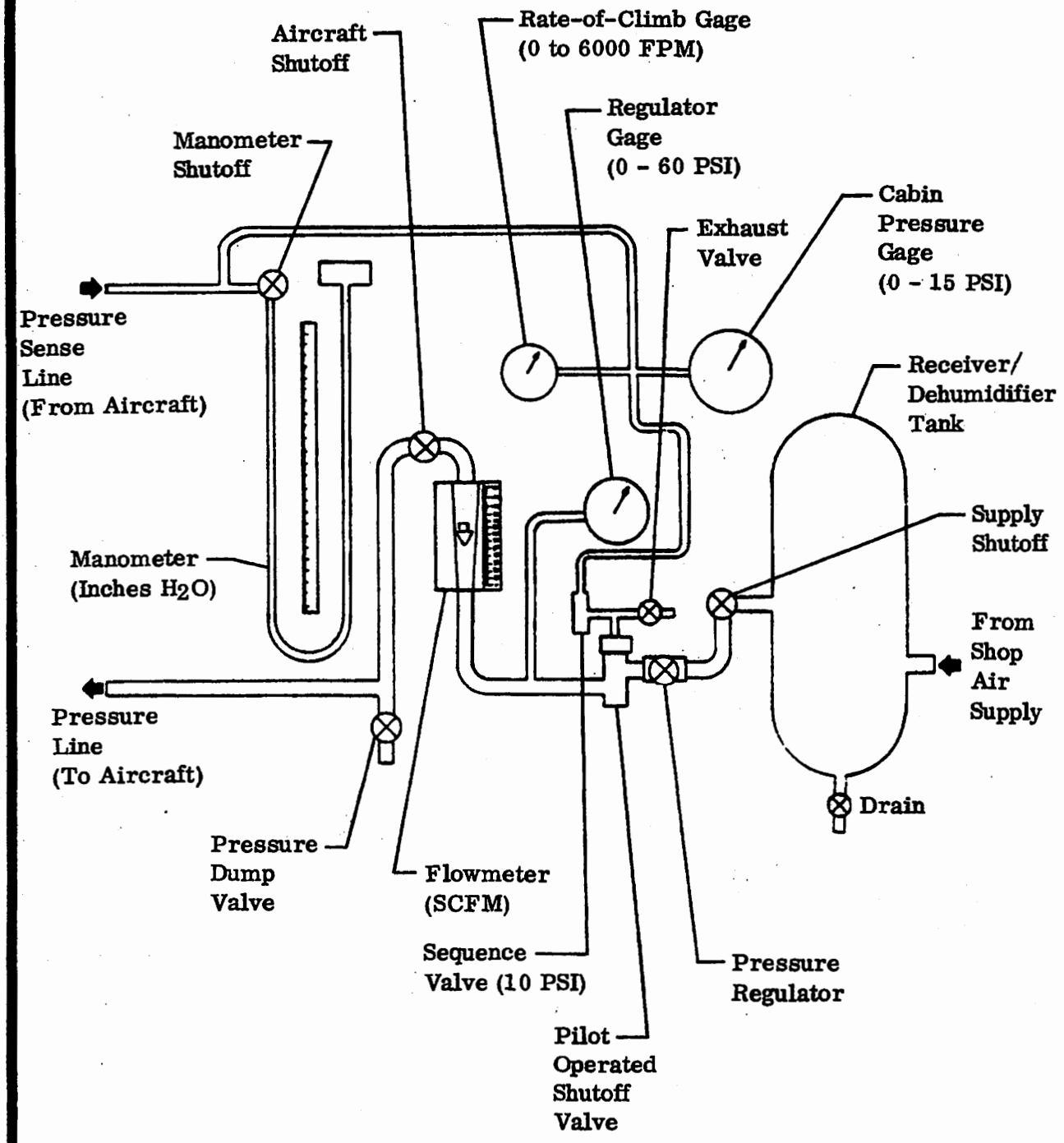
✱ Aircraft 25-090, 25-095 and Subsequent and previous aircraft incorporating AMK 72-3. (Installation of Cabin Altitude Limiter)

Pressurization System Control Schematic
Figure 103 (Sheet 1 of 2)



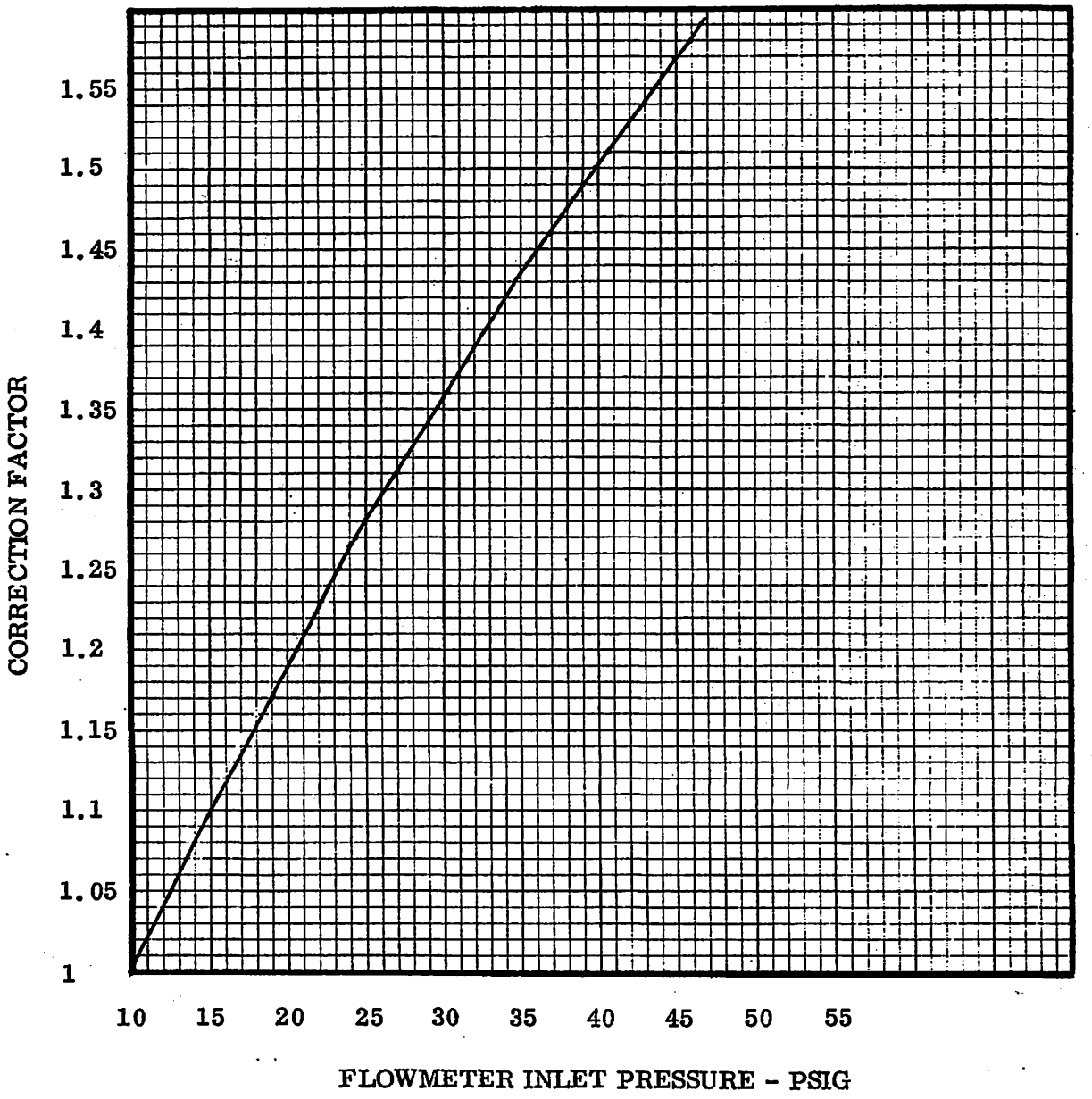
● 25-197, 25-292 Thru 25-226 Modified per AMK 78-5 (Installation of Cabin Altitude Pressure Limiter)

Pressurization System Control Schematic
Figure 103 (Sheet 2 of 2)



Pressurization Test Cart Schematic
Figure 104

1. Read SCFM from flowmeter.
2. Read flowmeter inlet pressure in PSIG.
3. Read correction factor from graph.
4. Multiply correction factor times flowmeter SCFM reading.



Flow Rate Conversion Chart
Figure 105

4. Trouble Shooting Functional Test (25-227 and Subsequent)

A. The following functional test procedure is provided as an aid in trouble shooting the cabin pressurization system, cabin temperature control system, and cabin leakage.

B. The aircraft shall be in flight configuration and pressurization system shall be completely installed.

NOTE: All drain holes and vents normally open during flight shall be left open during functional testing.

C. When performing any of the following functional tests, a data sheet (See figure 106.) should be utilized to record test data.

D. Tools and Equipment:

NOTE: The following tools and equipment or their equivalent are required in performing the following functional tests of the pressurization system.

NAME	PART NUMBER	MANUFACTURER	USE
Vacuum Gage (0-100 inches of H_2O)		Commercially Available	General
Compressed Air Source (filtered) with 0-30 psi gage (required only if engines are not run for functional test) and capable of 150 CFM at 40 psi.		Commercially Available	General
*Pitot-Static Tester	MB-1	Aircraft Products Co. Bridgeport, Pa.	General
*Pitot-Static Tester	1811-F	Barfield Instrument Corp. Atlanta, Georgia	General
Cabin Pressurization Test Cart	B1737	Gates Learjet	General
Compressed Nitrogen Source		Commercially Available	Cabin Temperature Control System Leakage Test

*NOTE: This tester shall be sent to the instrument lab once each month for certification. The altimeter and airspeed indicator shall have essentially zero case leakage and shall be checked for accuracy. Instrument correction cards shall accompany test rig.

CAUTION:
- ENSURE THAT ALL MOISTURE IS DRAINED FROM RECEIVER TANK AND DESICCANT OF CABIN PRESSURIZATION TEST CART PRIOR TO AND WHILE CONNECTED TO AIRCRAFT TO PREVENT AIRCRAFT SYSTEM CONTAMINATION.
- PULL STAB HEAT CIRCUIT BREAKERS WHILE PERFORMING FUNCTIONAL TEST.

E. Bleed Air System Electrical Check
(1) Set Bleed Air Switches to OFF. Check voltage at pins J and S of modulating valve control boxes. Voltage should be 24 vdc. Record reading on data sheet. (See figure 106.)
(2) Set Bleed Air Switches to ON. Check voltage at pins J and S. Voltage at pin J shall be zero and pin S shall be approximately 24 vdc. Record reading on data sheet.
(3) Set Bleed Air Switches to EMER. Check voltage at pins J and S. Voltage at pins J and S shall be zero after approximately 1.5 seconds. Record reading on data sheet.
(4) Set Bleed Air Switches to OFF. Check voltage at pins J and S. Voltage should be approzimately 24 vdc. Record reading on data sheet.

F. Cabin Pressurization Aneroid Switches
(1) Connect pitot-static tester to RH aneroid switch pressure port. Set RH Bleed Air Switch to ON. Check that voltage at pin S drops from 24 vdc to zero when tester altimeter reaches 9500 (±250) feet. Record reading on data sheet. (See figure 106.) Reduce pressure altitude to below 8300 feet. Set RH Bleed Air Switch to OFF. Repeat step 4.E.(2).
(2) Repeat step 4.F.(1) using LH aneroid switch. Record reading on data sheet.

G. Ground Pressure Bump Checkout
(1) Set Cabin Air Switch to OFF, squat switches in ground mode. Check voltage at P121-C for 28 vdc and P121-E zero ohms.
(2) Set Cabin Air Switch to ON, squat switches in ground mode. Check that temperature sensor blower starts to run after approximately 10 seconds.

H. Cabin Reference Line Leakage Test
(1) Gain access to and remove pressurization filter from aft pressure bulkhead and disconnect cabin pressure line (Chapter 57) from vacuum regulator. Cap all exposed fittings.
(2) Connect pitot-static tester to bulkhead fitting and apply pressure until pitot-static tester indicates 450 knots. Shut off valve on tester, sealing system. Leakage shall not exceed one knot in one minute. Record reading on data sheet. (See figure 106.)
(3) Disconnect pitot-static tester. Install filter, connect cabin pressure line to vacuum regulator, and restore system to normal.

I. Pressurization Leakage Test

(1) Set Battery Switches off.

(2) Gain access to pressurization module and remove filter. Cap all exposed fittings.

(3) Set cabin pressure controller (mini-controller) for maximum rate and maximum altitude.

(4) Set altimeter on pitot-static tester to sea level (29.92 inches of Hg).

(5) Remove cap from regulated vacuum line test port and connect pitot-static tester.

CAUTION: TO PREVENT DAMAGE TO THE CABIN PRESSURE CONTROLLER (MINI-CONTROLLER), APPLY AND RELEASE VACUUM AT A RATE NOT TO EXCEED 1,000 FEET PER MINUTE.

(6) Slowly apply vacuum to regulated vacuum line until 3,000 feet is indicated on altimeter. Allow vacuum to stabilize, then close valve on tester, sealing system.

NOTE: It is permissible to disconnect and cap cabin pressure line to vacuum regulator.

(7) Pitot-static tester altimeter shall not decrease more than 500 feet in one minute. Record reading on data sheet. (See figure 106.)

(8) Slowly release vacuum from regulated vacuum line. Disconnect pitot-static tester from test port. Remove cap, install pressurization module filter, connect cabin pressure line to vacuum regulator, and restore system to normal.

J. Regulated Vacuum Regulator Test (Ground Mode)

(1) Connect 0-100 inch of H_2O vacuum gage to regulated vacuum line test port.

(2) Set Cabin Air Switch to OFF and Battery Switches on; assure that squat switches are in ground mode.

(3) Provide an air source to vacuum regulator by either running one engine or attaching an air source to bleed air manifold.

(4) Slowly increase engine rpm until vacuum gage stabilizes or set air pressure at 45 psig.

(5) Record vacuum gage reading on data sheet. (See figure 106.)

(6) Check position of cabin air exhaust control valve poppet and cabin safety valve poppet; they shall be fully open. Record position on data sheet.

NOTE: Avionics control heads may be removed and an inspection mirror used to check cabin air exhaust control valve poppet.

(7) Set Cabin Air Switch to ON. Check that cabin safety valve starts to close after 15 (±5) seconds and is fully closed within 15 to 60 seconds. Record reading on data sheet.

K. Regulated Vacuum Regulator Test (Flight Mode)

(1) Set Pressurization AUTO-MAN Switch to AUTO. Pull SQUAT SW circuit breaker to simulate an in-flight mode.

(2) Increase engine rpm or air pressure until vacuum gage indicates vacuum has stabilized. Record engine rpm or pressure readings on data sheet. (See figure 106.)

(3) Record vacuum gage reading on data sheet.

(4) Select cabin altitude above field elevation. Cabin air exhaust control valve shall open.

(5) Set Pressurization AUTO-MAN Switch to MAN. Cabin air exhaust control valve poppet shall remain open. Record position of valve poppet on data sheet.

(6) Select below-field elevation on cabin pressure controller (mini-controller). Cabin air exhaust control valve shall remain open. Record position of valve poppet on data sheet. This check assures that pressurization system is in manual mode.

(7) Hold manual cabin altitude control valve knob to DN; cabin air exhaust control valve shall close. Record reading on data sheet.

(8) Hold manual cabin altitude control valve knob to UP; cabin air exhaust control valve shall open. Record reading on data sheet.

(9) Set Pressurization AUTO-MAN Switch to AUTO. Select below-field elevation on cabin pressure controller (mini-controller); cabin air exhaust control valve shall close. Record reading on data sheet.

(10) Select above-field elevation; cabin air exhaust control valve shall open. Record reading on data sheet.

(11) Reduce engine RPM to idle or shut off air pressure source. Disconnect vacuum gage from test port and install cap on test port.

(12) Restore system to normal.

L. Pressurized Cabin Test (Ground Test)

(1) Connect cabin pressurization test cart to aircraft.

(2) Cabin Air Switch shall be set to ON, Battery Switches shall be on, squat switches shall be in ground position, and Pressurization AUTO-MAN Switch shall be set to AUTO.

(3) Pressurize aircraft with authorized personnel in cabin, at a rate not to exceed 2000 feet per minute.

(4) Supply bleed air to vacuum regulator by running one engine or by connecting filtered compressed air of 45 (±5) psig to servo bleed air manifold upstream of pressure regulator.

(5) Set engine rpm or compressed air pressure to about 40 psi inlet pressure.

(6) Observe cabin air exhaust control valve position and record readings on data sheet. Valve shall be open.

(7) Record test cart U-tube manometer reading of cabin pressure on data sheet. (See figure 106.) Reading shall be within tolerance shown on data sheet.

(8) Set Pressurization AUTO-MAN Switch to MAN. Select various cabin altitudes and rates with cabin pressure controller (mini-controller). Pressures shall not change. Record readings on data sheet.

M. Pressurized Cabin Test (Flight Mode)

(1) Pull SQUAT SW circuit breaker to simulate flight mode.

(2) Set Pressurization AUTO-MAN Switch to AUTO, set cabin pressure controller (mini-controller) to field pressure altitude. Select cabin altitude above field pressure altitude. Check cabin rate-of-climb indicator. Record cabin rate-of-climb on data sheet. (See figure 106.)

NOTE: To determine field pressure altitude use copilot's flight altimeter, select 29.92 inches Hg. on the altimeter's barometer correction window. Altimeter will then indicate field pressure altitude.

(3) Select minimum rate (decrease) and below-sea level elevation on cabin pressure controller (mini-controller). Observe cabin rate-of-climb indicator and record reading on data sheet.

(4) Select maximum rate (increase) on cabin pressure controller (mini-controller). Observe cabin rate-of-climb indicator and record reading on data sheet.

(5) Select field pressure altitude on cabin pressure controller (mini-controller). Select minimum rate (decrease) on cabin pressure controller (mini-controller). Observe cabin rate-of-climb indicator and record reading on data sheet.

(6) Select maximum rate (increase) on cabin pressure controller (mini-controller). Observe cabin rate-of-climb indicator and record readings on data sheet.

(7) Note that increase in rate is smooth and linear. Select a nominal rate (approximately 500 feet per minute) on cabin pressure controller (mini-controller). Allow cabin altitude to stabilize and rate-of-climb indicator to reach zero. Record readings on data sheet.

(8) Depress SQUAT SW circuit breaker and record reading of rate-of-climb indicator on data sheet.

(9) Set Cabin Air Switch to OFF.

N. Cabin Leakage Test

(1) Plug cabin inlet port of differential pressure gage, if installed.

(2) Disconnect vacuum line from vacuum regulator and cap exposed fittings. Connect test cart to port on flow control valve.

(3) Set Battery Switches on. Select maximum rate (increase) and maximum altitude on cabin pressure controller (mini-controller).

WARNING:
- THIS PART OF TEST IS CONDUCTED WITH NO PERSONNEL IN THE CABIN.
- DO NOT SEAL HOLES THAT ARE NORMALLY OPEN DURING FLIGHT, SUCH AS DRAIN HOLES, VENTS, ETC.

(4) Close and secure cabin door. Slowly pressurize cabin to 8.0 psig at a rate not to exceed 2000 feet per minute.

(5) With cabin pressurized at 8.0 psig. Record reading of flow meter on data sheet. (See figure 106.) Determine cabin leakage rate using conversion chart shown on figure 109. Leakage rate shall not exceed 115 SCFM (Standard Cubic Feet per Minute).

NOTE: Standard Cubic Foot (SCF) is defined as a cubic foot of dry air at 60°F and 14.7 psia.

CAUTION: DO NOT EXCEED 3,000 FEET PER MINUTE TO DEPRESSURIZE.

(6) If cabin leakage rate is greater than 115 SCFM, depressurize aircraft and check cabin area, including cable seals, wire bundle seals, cabin door seals, etc., for damage.

WARNING: DO NOT SEAL HOLES THAT ARE NORMALLY OPEN DURING FLIGHT, SUCH AS DRAIN HOLES, VENTS, ETC.

(7) Depressurize cabin and repair pressure seals that are leaking excessively.

WARNING: DO NOT OPEN CABIN DOOR WITH CABIN PRESSURIZED.

CAUTION: DEPRESSURIZE CABIN AT A RATE NOT TO EXCEED 3000 FEET PER MINUTE.

(8) Repeat cabin leakage test after repairs are made.

O. Cabin Air Exhaust Control Valve and Cabin Safety Valve Test

(1) Slowly increase cabin pressure until cabin air exhaust control valve opens. Record reading on data sheet. (See figure 106.)

(2) Apply a pressure, not to exceed 1 psig to cabin air exhaust control valve static port.

WARNING: DO NOT EXCEED 9.9 PSIG CABIN PRESSURE.

(3) Continue to increase cabin pressure until cabin safety valve opens. Record reading on data sheet.

NOTE: The cabin safety valve shall open a minimum of 0.1 psig above opening of cabin air exhaust control valve.

(4) Depressurize cabin at a rate not to exceed 3000 feet per minute. Remove plug from differential pressure gage.

WARNING: DO NOT OPEN CABIN BEFORE CABIN PRESSURE REACHES ZERO PRESSURE AND CABIN RATE IS ZERO.

(5) Shut down and disconnect test cart from aircraft. Install cap on flow control valve test port and bleed air manifold.

(6) Depress STAB HEAT circuit breaker and restore system to normal.

DATA SHEET

Para.	Test	Required	Actual
4.E.(1)	Voltage, Bleed Air Switches OFF	24 volts at pins J & S	_____volts
4.E.(2)	Voltage, Bleed Air Switches ON	0 volts at pin J, 24 volts at pin 5	_____volts
4.E.(3)	Voltage, Bleed Air Switches EMERG	0 volts at pin J & S after 1.5 seconds	_____volts
4.E.(4)	Voltage, Bleed Air Switches OFF	24 volts at pins J & S	_____volts
4.F.(1)	Voltage, RH Bleed Air Switch ON	Voltage drops to 0 as altitude approaches 9500 ±250 feet	_____volts
4.F.(2)	Voltage, LH Bleed Air Switch ON	Voltage drops to 0 as altitude approaches 9500	_____volts
4.G.	Ground pressure bump electrical circuit checkout	Table V complied with	_____yes _____no
4.H.(2)	Cabin Reference Line	450 kts. minimum after 1 minute	_____knots
4.J.(7)	System Leakage	500 feet after 1 minute	_____feet
4.J.(4)	Required Air Pressure	_____% rpm or 15 psig	_____% rpm or _____psig
4.J.(5)	Regulated Vacuum	44 to 65 inches H_2O	_____inches H_2O
4.J.(6)	Cabin Air Exhaust Control Valve & Cabin Safety Valve	Full Open	_____
4.J.(7)	Cabin Safety Valve Closes	Starts to close 15 ±5 seconds Full closed 15 to 60 seconds	_____seconds _____seconds
4.K.(2)	Required Air Pressure	_____% rpm or 15 psig maximum	_____% rpm of _____psig
4.K.(3)	Regulated Vacuum	44 to 65 inches H_2O	_____inches H_2O
4.K.(4)	Cabin Air Exhaust Control Valve Position	Open	_____
4.K.(5)	Cabin Air Exhaust Control Valve Position	Open	_____
4.K.(6)	Cabin Air Exhaust Control Valve Position	Open	_____
4.K.(7)	Cabin Air Exhaust Control Valve Position	Closed	_____
4.K.(8)	Cabin Air Exhaust Control Valve Position	Open	_____
4.K.(9)	Cabin Air Exhaust Control Valve Position	Closed	_____
4.K.(10)	Cabin Air Exhaust Control Valve Position	Open	_____

Pressurization Control Trouble Shooting Data Sheet
Figure 106 (Sheet 1 of 2)

DATA SHEET

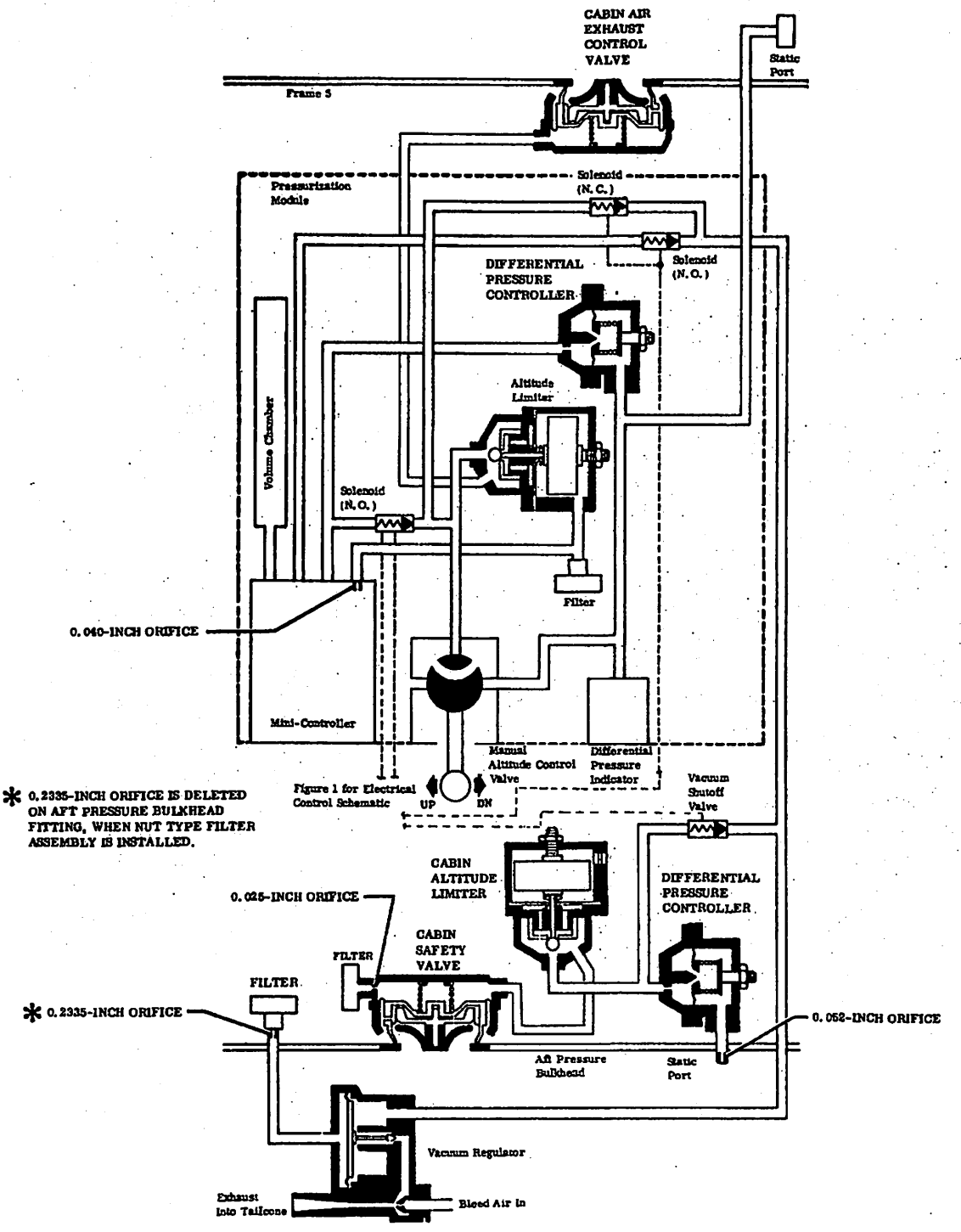
Para.	Test	Required	Actual
4.L.(7)	Ground Differential Pressure	7 inches H_2O maximum	_____ inches H_2O
4.L.(8)	Manual Altitude Hold	0 feet (Change)	_____ feet
4.M.(2)	Transition Bump Ground to Flight Mode	±100 fpm	_____ fpm
4.M.(3)	Minimum Down Rate - Auto	175 (±125) fpm	_____ fpm
4.M.(4)	Maximum Down Rate - Auto	2500 (±500) fpm	_____ fpm
4.M.(5)	Minimum Up Rate - Auto	175 (±125) fpm	_____ fpm
4.M.(6)	Maximum Up Rate - Auto	2500 (±500) fpm	_____ fpm
4.M.(7)	Rate Controller (Isobaric Accuracy)	Smooth & Linear	_____
		Field Pressure Altitude ±350 feet	_____ feet
4.M.(8)	Transition Bump - Landing (Flight to Ground Mode)	Less than 100 fpm	_____ fpm
4.N.(4)	Cabin Leakage	115 scfm	_____ scfm
4.O.(1)	Cabin Air Exhaust Control Valve, Differential Pressure Relief	9.25 to 9.55 psig	_____ psig
4.O.(3)	Cabin Safety Valve, Differential Pressure Relief	9.55 to 9.85 psig	_____ psig

AIRCRAFT S/N _____ INSPECTOR _____

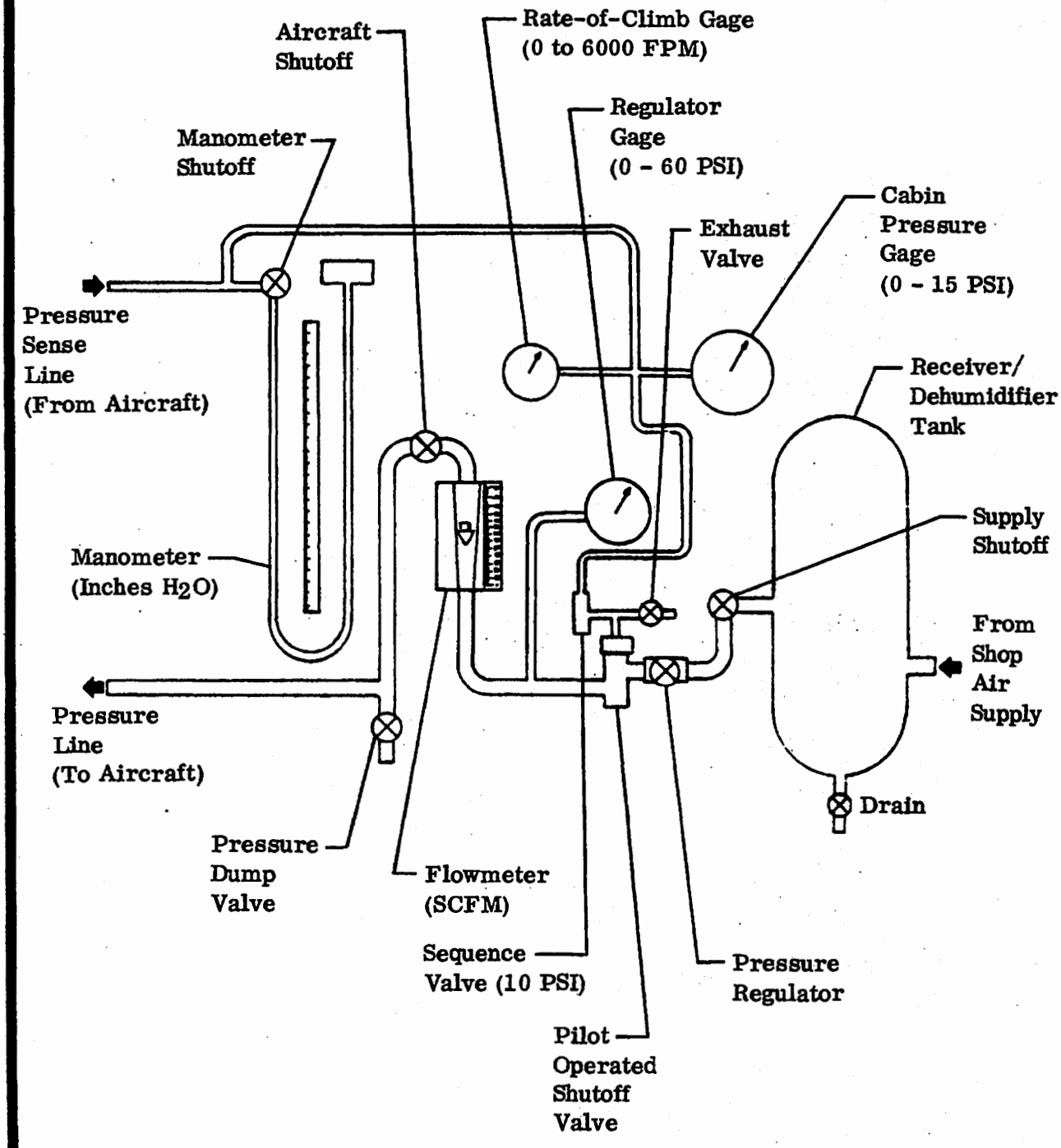
PRESSURIZATION MODULE S/N _____ OBSERVER _____

CABIN PRESSURE CART _____ DATE _____

Pressurization Control Trouble Shooting Data Sheet
Figure 106 (Sheet 2 of 2)

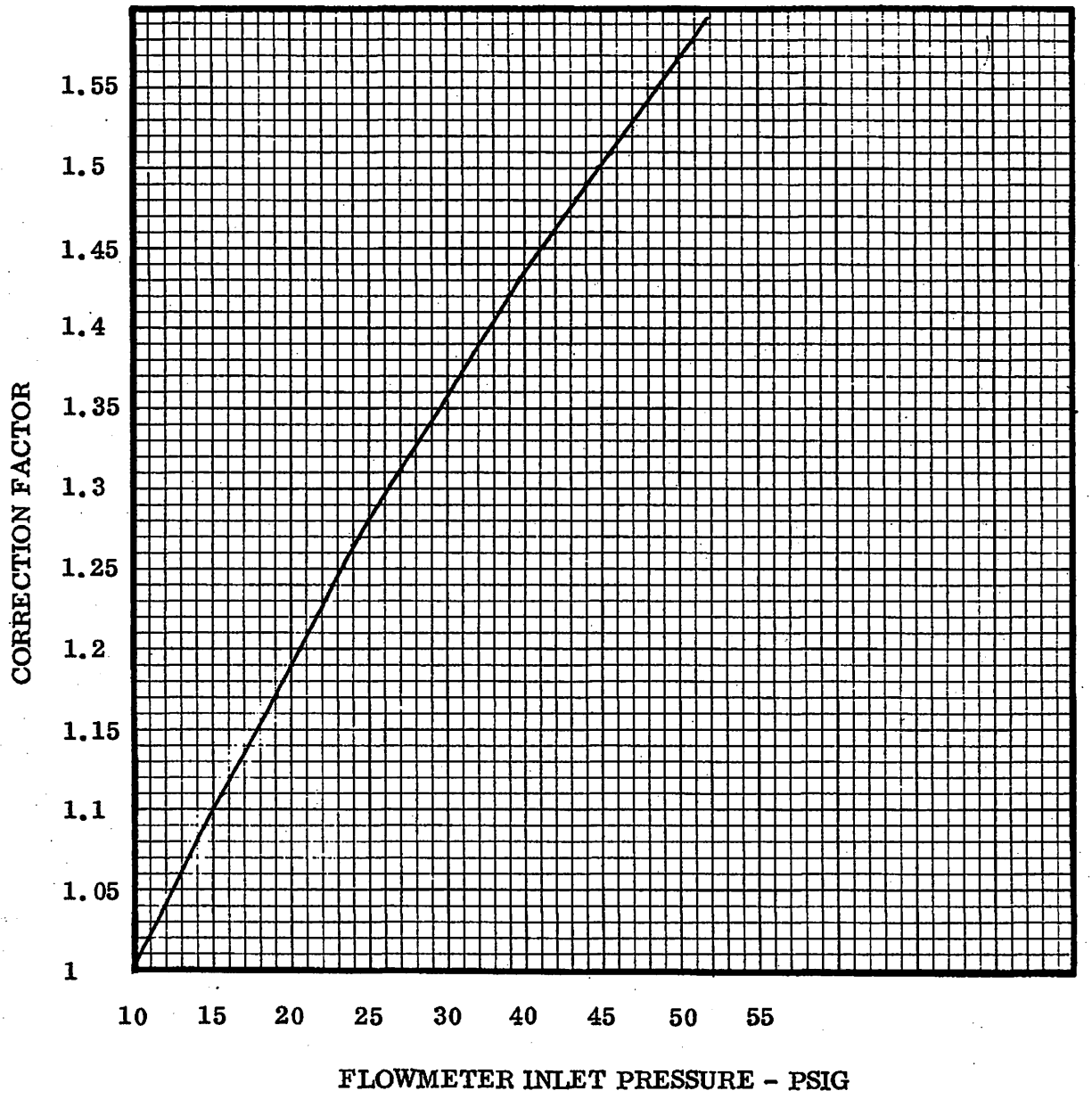


Pressurization System Control Schematic
Figure 107



Pressurization Test Cart Schematic
Figure 108

1. Read SCFM from flowmeter.
2. Read flowmeter inlet pressure in PSIG.
3. Read correction factor from graph.
4. Multiply correction factor times flowmeter SCFM reading.



Flow Rate Conversion Chart
Figure 109

PRESSURIZATION CONTROL - MAINTENANCE PRACTICES

1. Inspection/Check

A. The pressurization system should be operationally checked after any maintenance is performed on the pressurization system. (Aircraft 25-061, 25-070 thru 25-226)

NOTE: In the following steps involving positioning of the SQUAT SW circuit breaker, the circuit breaker will be either in flight mode or ground mode.
Ground Mode - aircraft is resting on gear with struts compressed.
Flight Mode - the SQUAT SW circuit breaker must be pulled to simulate Flight Mode.

(1) Close and latch cabin door.
(2) Start one engine. (Refer to FAA Approved Airplane Flight Manual for engine starting procedure..) Set engine at 70% rpm.
(3) Set Bleed Air Switches to ON and Pressurization AUTO-MAN Switch to AUTO.
(4) Rotate rate selector knob to DECR (completely counterclockwise).
(5) Set Cabin Air Switch to NORM; cabin will rate down, but not to exceed 500 fpm and 0.5 psid.
(6) Move thrust levers from 70% to 50% and then back to 70% rpm.
(7) Pull SQUAT SW circuit breaker to simulate flight mode. Pull and tag GEAR circuit breaker.
(8) Set altitude controller at 1000 feet below field elevation; vertical speed indicator shall show an increase in down rate.
(9) Set Cabin Air Switch to MAX; vertical speed indicator may indicate 2000 fpm down for a short time then return to down rate as selected on rate selector.
(10) Set Cabin Air Switch to NORM; vertical speed indicator may indicate 2000 fpm up for a short time then return to down rate as selected on rate selector.
(11) Set Pressurization AUTO-MAN Switch to MAN and move manual cabin pressure control valve knob to DN; cabin pressure should increase. Move manual cabin pressure control valve knob to UP; cabin pressure shall decrease. Pressurize cabin to 1 to 2 psid.
(12) Set altitude controller above field elevation, rate selector to DECR, and Pressurization AUTO-MAN Switch to AUTO; cabin should rate up. Move rate selector from DECR to INCR; vertical speed indicator shall show an increase in up rate.
(13) Remove tag and depress GEAR circuit breaker. Depress SQUAT SW circuit breaker; cabin pressure shall stabilize at less than 0.5 psid.
(14) Set Cabin Air Switch to OFF and shut down engine.

B. The pressurization system should be operationally checked after any maintenance is performed on the pressurization system. (Aircraft 25-227 and Subsequent)

NOTE: In the following steps involving positioning of the SQUAT SW circuit breaker, the circuit breaker will be either in flight mode or ground mode.
Ground Mode - aircraft is resting on gear with struts compressed.
Flight Mode - the SQUAT SW circuit breaker must be pulled to simulate Flight Mode.

(1) Close and latch cabin door.
(2) Start both engines. (Refer to FAA Approved Airplane Flight Manual for engine starting procedure.) Set engines at 70% rpm.
(3) Set Pressurization AUTO-MAN Switch to AUTO and set Bleed Air Switches to ON.
(4) Set rate selector switch to DECR (completely counterclockwise).
(5) Set Cabin Air Switch to ON. Cabin shall rate down, but not to exceed 500 fpm and 0.5 psid. Check that temperature sensor blower starts to run approximately 10 seconds after Cabin Air Switch is set to ON.
(6) Move throttle levers from 70% to 50% and then back to 70% rpm; cabin rate shall not exceed 500 fpm.
(7) Pull SQUAT SW circuit breaker to simulate flight mode.
(8) Set altitude controller at 1000 feet below field elevation. Vertical speed indicator shall show an increase in down rate.
(9) Set LH Bleed Air Switch to EMER; the vertical speed indicator may indicate 2000 fpm down for a short time then return to down rate as selected on rate selector.
(10) Set LH Bleed Air Switch to OFF and then to ON. Vertical speed indicator may indicate 200 fpm up for a short time then return to down rate as selected on rate selector.
(11) Perform steps 1.B.(9) and 1.B.(10) using the RH Bleed Air Switch.
(12) Set Pressurization AUTO-MAN Switch to MAN and move manual cabin pressure control valve knob to DN; cabin pressure shall increase. Move manual cabin pressure control valve knob to UP; cabin pressure shall decrease. Pressurize cabin to 1 to 2 psid.
(13) Set altitude controller above field elevation, rate selector to DECR, and Pressurization AUTO-MAN Switch to AUTO; cabin shall rate up. Move rate selector from DECR to INCR; vertical speed indicator shall show an increase in up rate.
(14) Depress SQUAT SW circuit breaker; cabin pressure shall stabilize at less than 0.5 psid.
(15) Set Cabin Air Switch to OFF and shut down engines.

2. Functional Test (Aircraft 25-227 and Subsequent)

A. This functional test is to be performed in accordance with the current inspection intervals specified in Chapter 5.

B. The aircraft shall be in flight configuration and pressurization system shall be completely installed.

NOTE: All drain holes and vents normally open during flight shall be left open during functional testing.

C. When performing any of the following functional tests, a data sheet (See figure 201.) should be utilized to record test data.

D. Tools and Equipment:

NOTE: The following tools and equipment or their equivalent are required in performing the following functional tests of the pressurization system.

NAME	PART NUMBER	MANUFACTURER	USE
Vacuum Gage (0-100 inches of H_2O)		Commercially Available	General
Compressed Air Source (filtered) with 0-30 psi gage (required only if engines are not run for functional test) and capable of 150 CFM at 40 psi.		Commercially Avialable	General
*Pitot-Static Tester	MB-1	Aircraft Products Co. Bridgeport, Pa.	General
*Pitot-Static Tester	1811F	Barfield Instrument Corp. Atlanta, Georgia	General
Cabin Pressurization Test Cart	B1737	Gates Learjet	General

*NOTE: This tester shall be sent to the instrument lab once each month for certification. The altimeter and airspeed indicator shall have essentially zero case leakage and shall be checked for accuracy. Instrument correction cards shall accompany test rig.

CAUTION:
- ENSURE THAT ALL MOISTURE IS DRAINED FROM RECEIVER TANK AND DESICCANT OF CABIN PRESSURIZATION TEST CART PRIOR TO AND WHILE CONNECTED TO AIRCRAFT TO PREVENT AIRCRAFT SYSTEM CONTAMINATION.
- PULL STAB HEAT CIRCUIT BREAKER WHILE PERFORMING FUNCTIONAL TEST.

E. Bleed Air System Electrical Check

CAUTION: PULL STAB HEAT CIRCUIT BREAKER WHILE PERFORMING FUNCTIONAL TEST.

(1) Set Battery Switches on.

(2) Set Bleed Air Switches to OFF. Check voltage at pins J and S of ECS valve control box (E210 and E211) plugs. Voltage at pins J and S shall be 24 vdc. Record reading on data sheet. (See figure 201.)

(3) Set Bleed Air Switches to ON. Check voltage at pins J and S of ECS valve control box (E210 and E211) plugs. Voltage at pin J shall be zero and pin S shall be approximately 24 vdc. Record reading on data sheet.

(4) Set Bleed Air Switches to EMER. Check voltage at pins J and S of ECS valve control box (E210 and E211) plugs. Voltage at pins J and S shall be zero after approximately 1.5 seconds. Record reading on data sheet.

(5) Set Bleed Air Switches to OFF. Check voltage at pins J and S of ECS valve control box (E210 and E211) plugs. Voltage shall be approximately 24 vdc. Record reading on data sheet.

F. Cabin Pressurization Aneroid Switches

(1) Connect pitot and static test set to RH aneroid switch pressure port. Set RH Bleed Air Switch to ON. Check that voltage at pin S drops from 24 vdc to zero when pitot-static test set altimeter reaches 9500 (±250) feet. Record reading on data sheet. (See figure 201.) Reduce test set altimeter to below 8300 feet. Check for 24 vdc at pin S. This indicates that aneroid switch has reset.

(2) Repeat step 2.F.(1) using LH Bleed Air Switch. Record readings on data sheet.

G. Cabin Leakage Test

WARNING: DO NOT OPEN CABIN DOOR WITH CABIN PRESSURIZED.

(1) Connect cabin pressurization test cart to test port adjacent to flow control valve. Pull SQUAT SW circuit breaker to simulate flight mode.
(2) Remove attaching parts and clamps securing defog control cable to pressurization module and defog control valve. This will allow module to be lowered. Lower module and plug cabin inlet port of module differential pressure gage.
(3) Disconnect vacuum line from vacuum regulator and cap exposed fittings.
(4) Set Battery Switches on. Select maximum rate (increase) and maximum altitude on cabin pressure controller (mini-controller).

WARNING: THIS PART OF TEST IS CONDUCTED WITH NO PERSONNEL IN THE CABIN.

(5) Close and secure cabin door. Slowly pressurize cabin to 8.0 psig at a rate not to exceed 2000 feet per minute.
(6) With cabin pressurized at 8.0 psig, stabilize pressure at regulator pressure gage to 20 psig. Record reading of flow meter on data sheet. (See figure 201.) Determine cabin leakage using conversion chart shown on figure 203. Leakage rate shall not exceed 115 SCFM (Standard Cubic Feet per Minute).

NOTE: Standard Cubic Feet (SCF) is defined as a cubic foot of dry air at 60°F and 14.7 psia.

WARNING: DO NOT SEAL DRAIN HOLES OR VENTS WHICH ARE NORMALLY OPEN IN FLIGHT.

CAUTION: DO NOT EXCEED 3,000 FEET PER MINUTE TO DEPRESSURIZE.

(7) If leakage rate is greater than 115 SCFM, depressurize aircraft and check cabin area, including cable seals, wire bundle seals, cabin door seals, etc., for damage.
(8) Repeat cabin leakage test after repairs are made.

H. Cabin Air Exhaust Control Valve and Cabin Safety Valve Test

WARNING: DO NOT OPEN CABIN DOOR WITH CABIN PRESSURIZED.

(1) Slowly increase cabin pressure until cabin air exhaust control valve opens. Record reading on data sheet. (See figure 201.)

NOTE: If the compressed air source has limited capacity in excess of the cabin leak rate, the outflow valve may open as low as 9.0 psig.

(2) Cover both RH aft static port and alternate static port inside nose compartment. This will close cabin air exhaust control valve. Maintenance personnel may hold a finger over each static port to accomplish this.

WARNING: DO NOT EXCEED 9.9 PSIG CABIN PRESSURE.

(3) Continue to increase cabin pressure until cabin safety valve opens. Record reading on data sheet.

NOTE:
- Safety valve shall open a minimum of 0.1 psig above opening of cabin air exhaust control valve.
- If the compressed air source has capacity in excess of the cabin leak rate, the safety valve may open as low as 9.3 psig.

(4) Relieve pressure at cabin air exhaust control valve static port. Depressurize cabin at a rate not to exceed 3000 feet per minute. Remove plug from differential pressure gage.

I. Altitude Limiter Test

(1) Loosen attaching parts and lower pressurization module.
(2) Remove plastic tie securing hose (filter to altitude limiter) to altitude limiter end. Disconnect hose from altitude limiter fitting.
(3) Attach pitot-static tester to altitude limiter.
(4) Apply a steady vacuum to altitude limiter until test altimeter shows a drop in altitude. Drop in altitude shall occur at 11,500 (±1500) feet. Record reading on data sheet. (See figure 201.) Drop in altitude indicates altitude limiter has opened.
(5) Release vacuum from pitot-static tester. Disconnect tester from altitude limiter.
(6) Connect hose to altitude limiter fitting and secure with plastic tie.
(7) Raise and secure pressurization module.
(8) Gain access to altitude limiter located on aft pressure bulkhead.

(9) Remove fitting with screen from altitude limiter.

NOTE: Fabricate an adapter which will allow attachment of pitot-static tester to altitude limiter. Threads of adapter must be 3/4-16NF-3A and no longer than threads on removed fitting.

(10) Install adapter in altitude limiter and attach pitot-static tester.

(11) Apply a steady vacuum to altitude limiter until test altimeter shows a drop in altitude. Drop in altitude shall occur at 11,500 (±1500) feet. Record reading on data sheet. Drop in altitude indicates that altitude limiter has opened.

(12) Release vacuum from pitot-static tester. Disconnect tester from altitude limiter.

(13) Remove adapter from altitude limiter and install previously removed fitting with screws.

(14) Install previously removed equipment and restore system to normal.

DATA SHEET

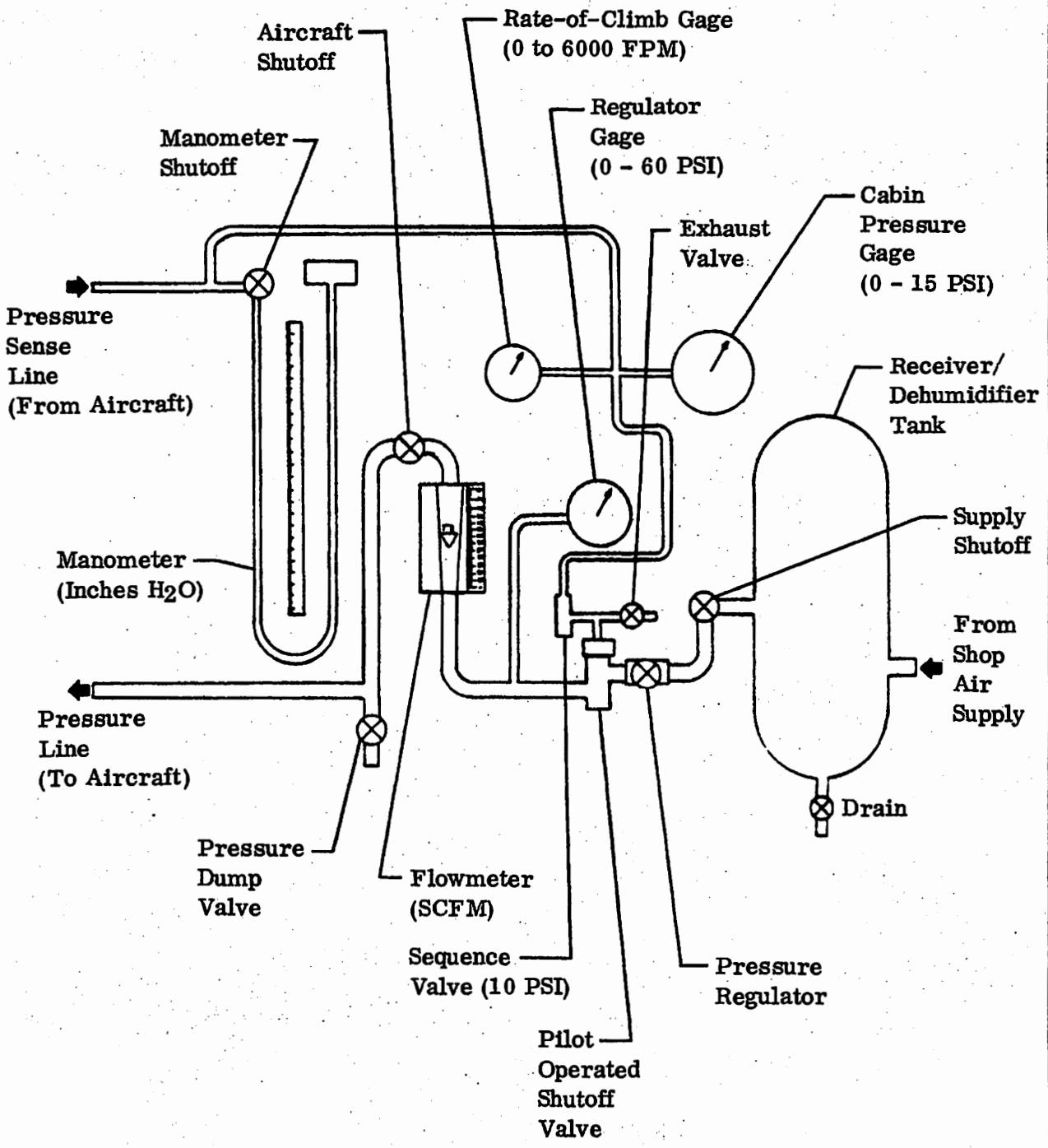
Para.	Test	Required	Actual
2.E.(2)	Voltage, Bleed Air Switches OFF	24 volts at pins J & S	_____volts
2.E.(3)	Voltage, Bleed Air Switches ON	0 volts at pin J, 24 volts at pin S	_____volts
2.E.(4)	Voltage, Bleed Air Switches EMERG	0 volts at pins J & S after 1.5 seconds	_____volts
2.E.(5)	Voltage, Bleed Air Switches OFF	24 volts at pins J & S	_____volts
2.F.(1)	Voltage, RH Bleed Air Switch ON	Voltage drops to 0 as altitude approaches 9500 (±250) feet	_____volts
2.F.(2)	Voltage, LH Bleed Air Switch ON	Voltage drops to 0 as altitude approaches 9500 (±250) feet	_____volts
2.F.(6)	Cabin Leakage	115 scfm	_____scfm
2.H.(1)	Cabin Air Exhaust Control Valve, differential pressure relief	9.25 to 9.55 psig	_____psig
2.H.(3)	Cabin Safety Valve, differential pressure relief	9.55 to 9.85 psig	_____psig
2.I.(4)	Altitude Limiter (Pressurization Module)	11,500 (±1500) feet	_____feet
2.I.(11)	Altitude Limiter (Aft Pressure Bulkhead)	11,500 (±1500) feet	_____feet

AIRCRAFT S/N_____ INSPECTOR_____

PRESSURIZATION MODULE S/N_____ OBSERVER_____

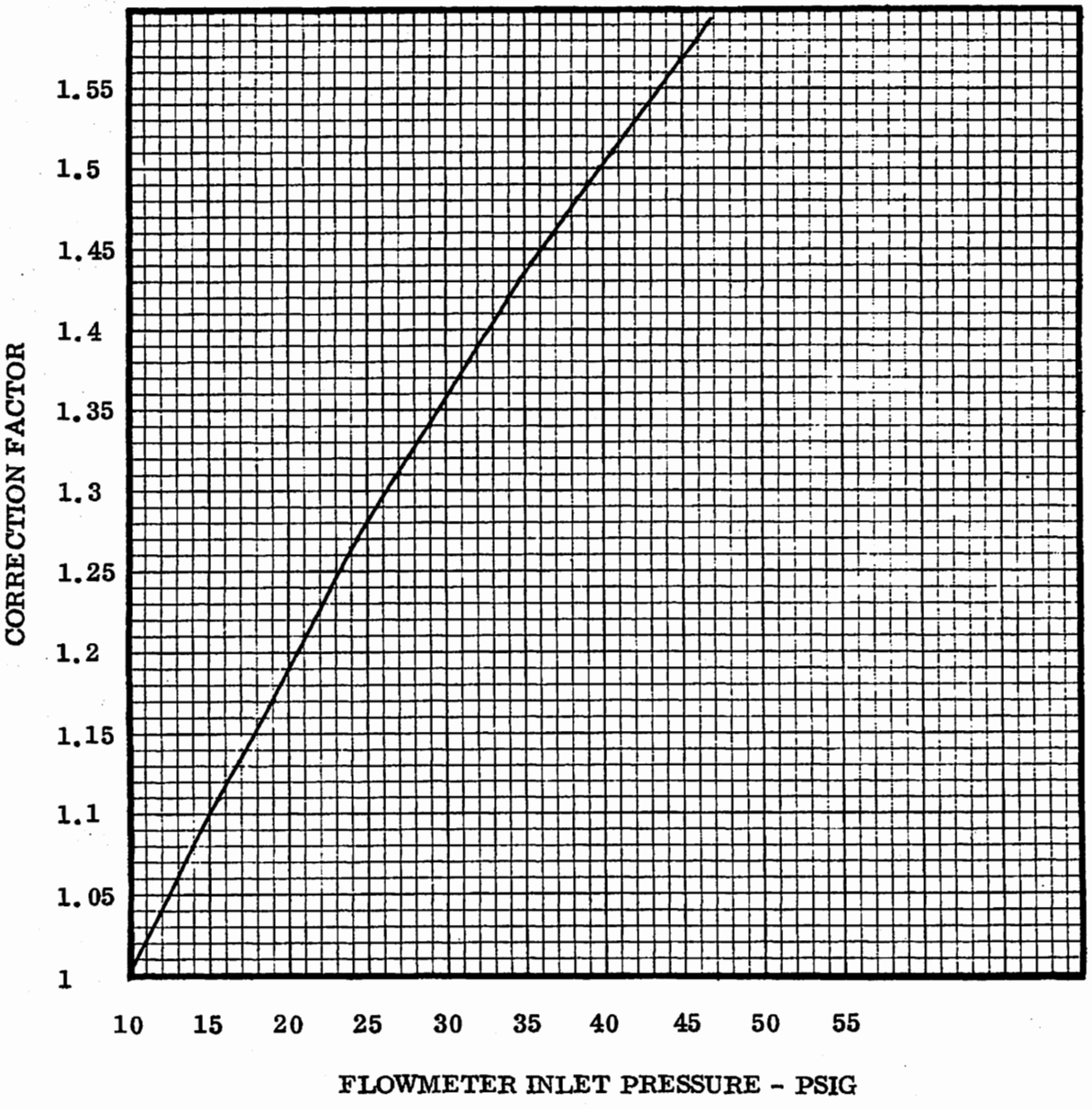
CABIN PRESSURE CART_____ DATE_____

Cabin Pressurization Functional Test Data Sheet
Figure 201



Pressurization Test Cart Schematic
Figure 202

1. Read SCFM from flowmeter.
2. Read flowmeter inlet pressure in PSIG.
3. Read correction factor from graph.
4. Multiply correction factor times flowmeter SCFM reading.



Flow Rate Conversion Chart
Figure 203

PRESSURIZATION MODULE - MAINTENANCE PRACTICES

1. Removal/Installation

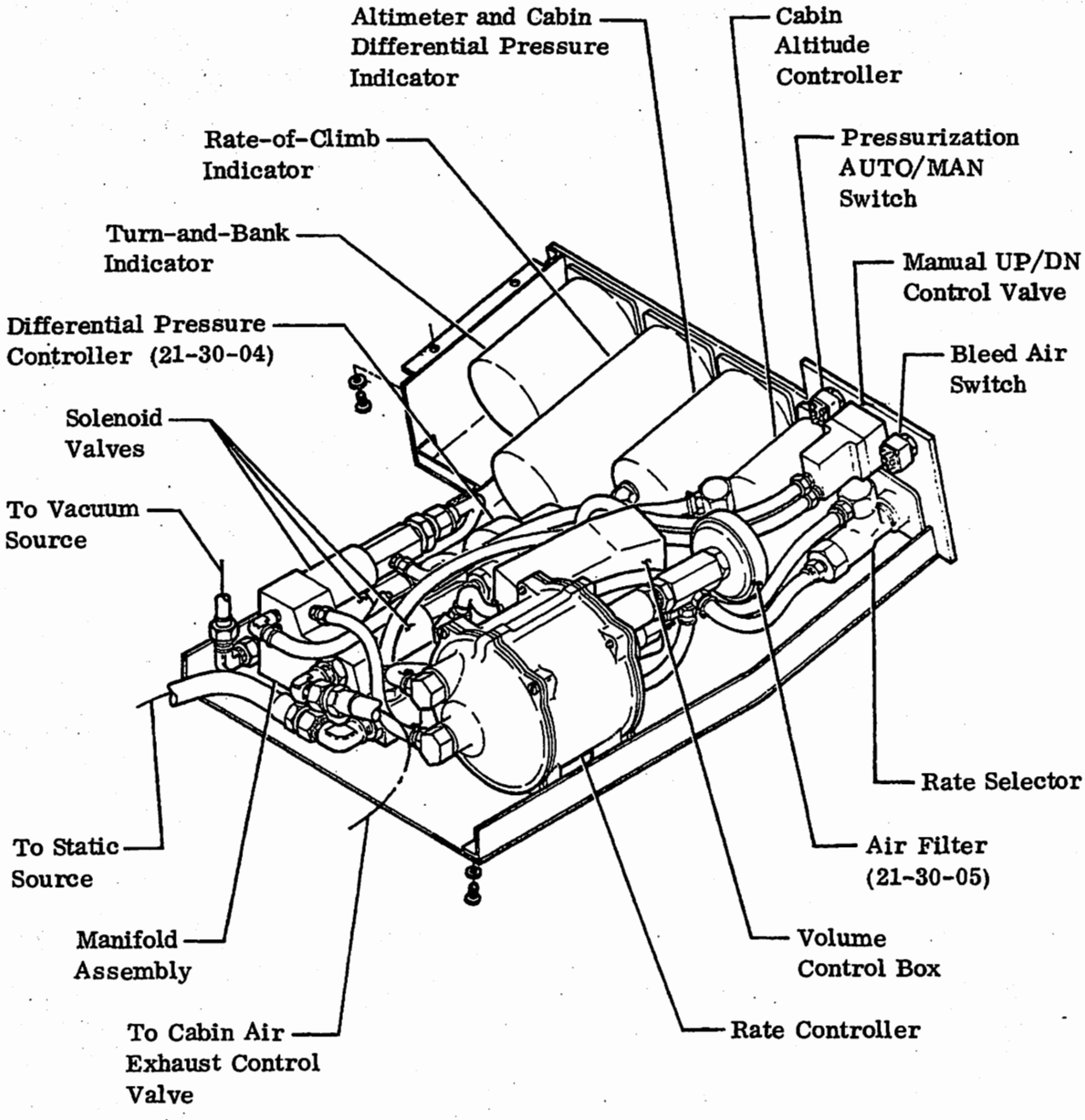
WARNING: ALL MAINTENANCE WORK SHOULD BE DONE IN A CLEAN ENVIRONMENT TO HELP MAINTAIN THE INTEGRITY OF THE SYSTEM. WHEN ANY TUBE OR HOSE ASSEMBLY IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ASSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED AND IDENTIFIED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE A SYSTEM MALFUNCTION.

CAUTION: ALL FITTINGS THAT MATE TO PLASTIC COMPONENTS SHALL BE TORQUED 15 (±5) INCH-POUNDS. WHEN ATTACHING A TUBE OR HOSE ASSEMBLY TO AN ADAPTER FITTING LOCATED IN A PLASTIC COMPONENT, HOLD ADAPTER FIRMLY IN PLACE WITH WRENCH BEFORE APPLYING APPROPRIATE TORQUE TO TUBE OR HOSE ASSEMBLY FITTING. (Refer to Chapter 20.)

NOTE: Replace or clean pressurization module filter at intervals as specified in Chapter 5.

A. Remove Module (See figure 201.)
   (1) Remove screws, two on each side of module, and lower pressurization module.
   (2) Disconnect static, vacuum, and cabin air exhaust control valve lines from module. Cap and identify all exposed openings.
   (3) Disconnect electrical connector from module.
   (4) Remove screws securing module to hinge and remove module from aircraft.

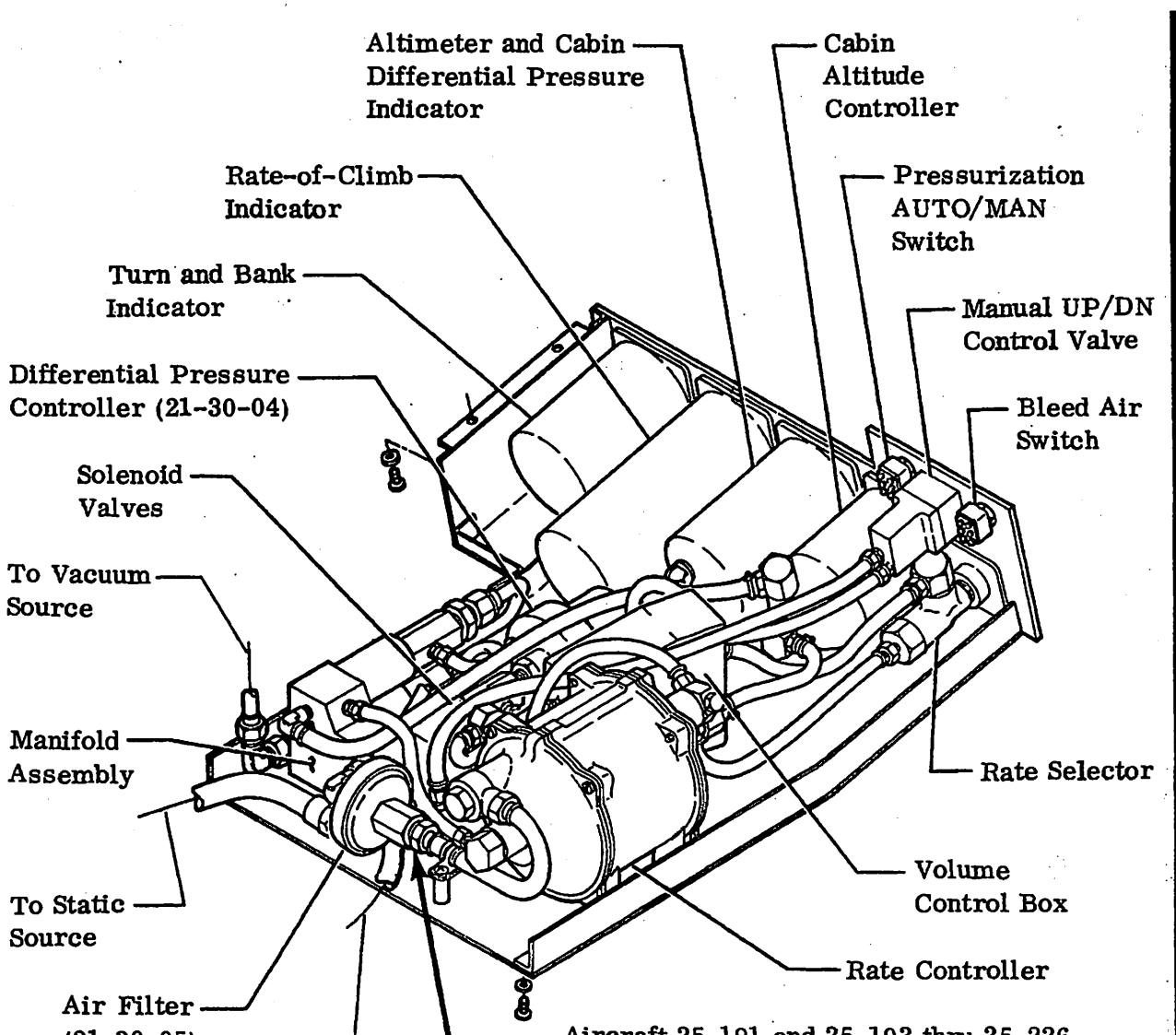
B. Install Module (See figure 201.)
   (1) Install module and secure hinge to module with screws.
   (2) Remove caps and connect static, vacuum, and cabin air exhaust control valve lines to pressurization module.
   (3) Connect electrical connector to module.
   (4) Visually inspect installation to ensure components are installed properly.
   (5) Raise and secure module to instrument panel with attaching parts.
   (6) Perform operational check of pressurization system. (Refer to 21-30-00.)



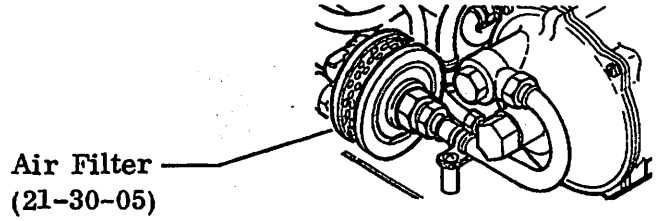
Aircraft 25-061, 25-070 thru 25-190 and 25-192, not Modified per SSK-940

Pressurization Module
Figure 201 (Sheet 1 of 4)

13-64C-5



Aircraft 25-191 and 25-193 thru 25-226, not Modified per SSK-940

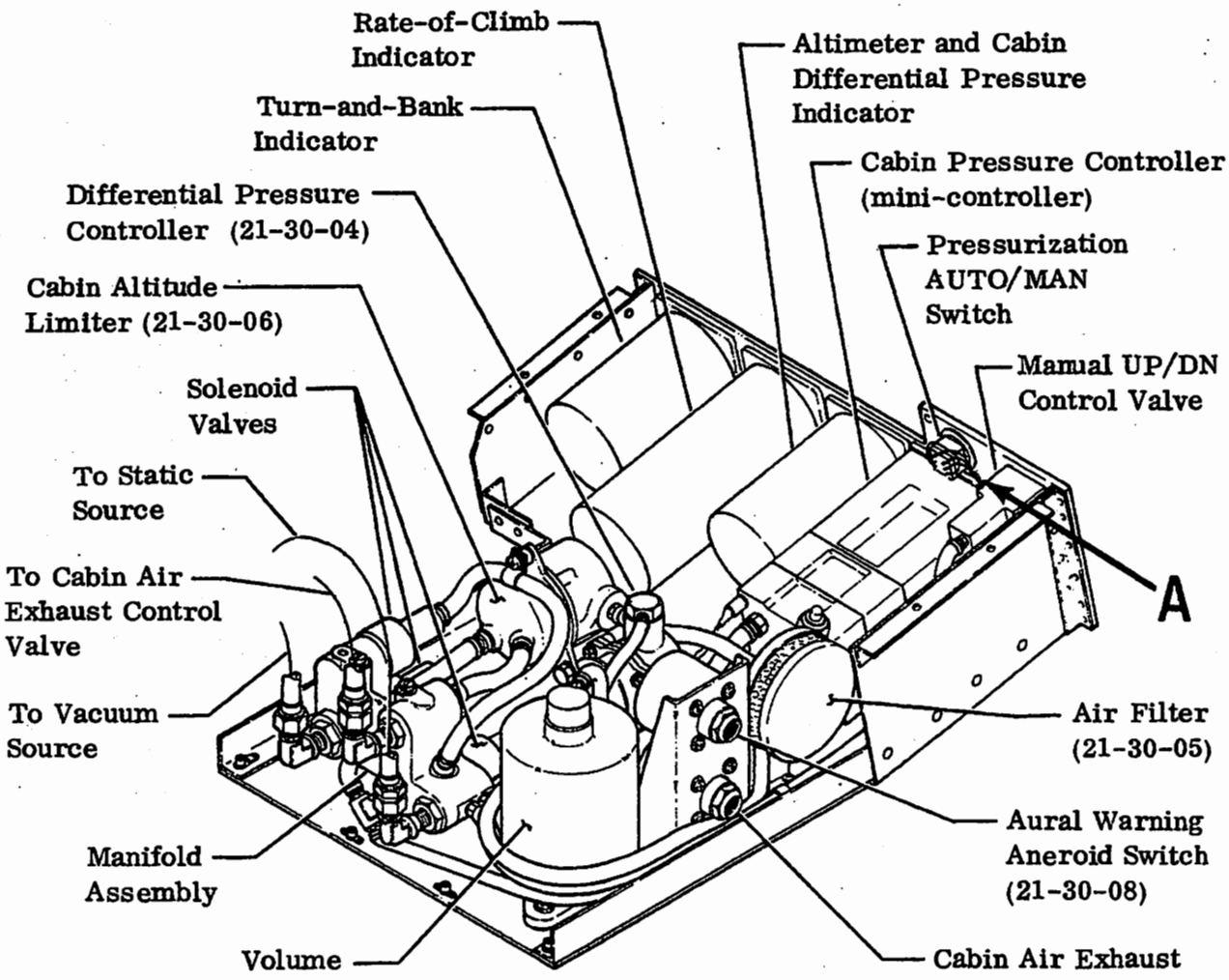


Detail A

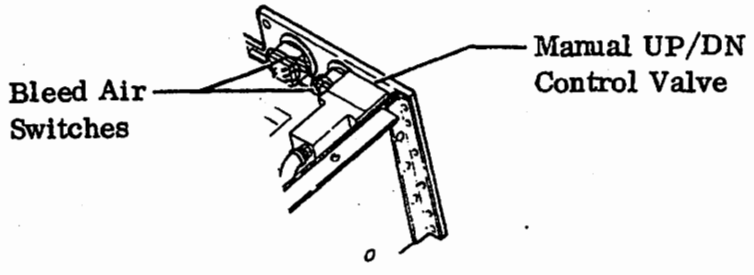
Aircraft 25-061, 25-070 thru 25-226 Modified per SSK-940

Pressurization Module
Figure 201 (Sheet 2 of 4)

13-64C-5



Aircraft 25-227 thru 25-256

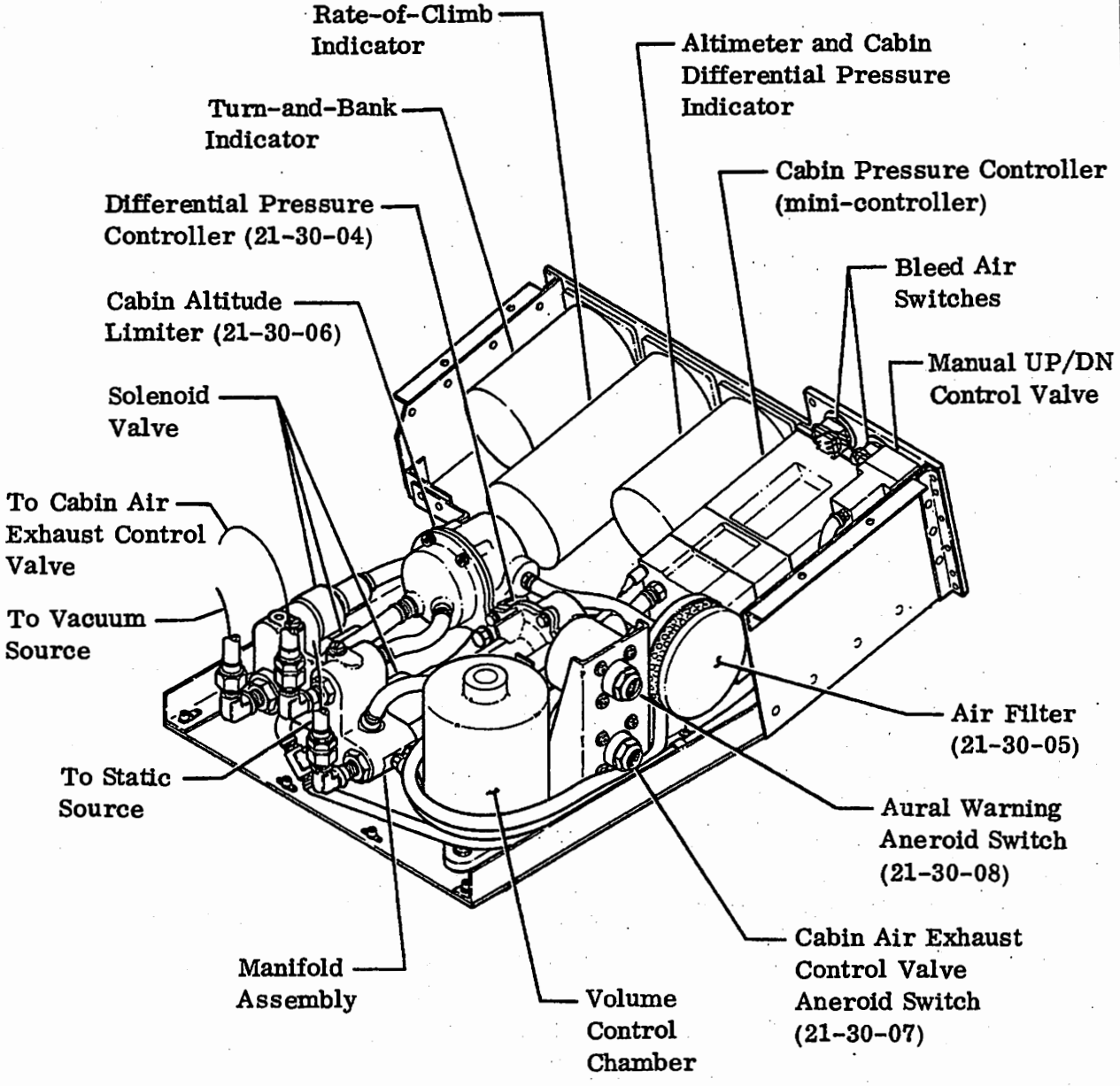


Detail A

Aircraft 25-257 thru 25-318

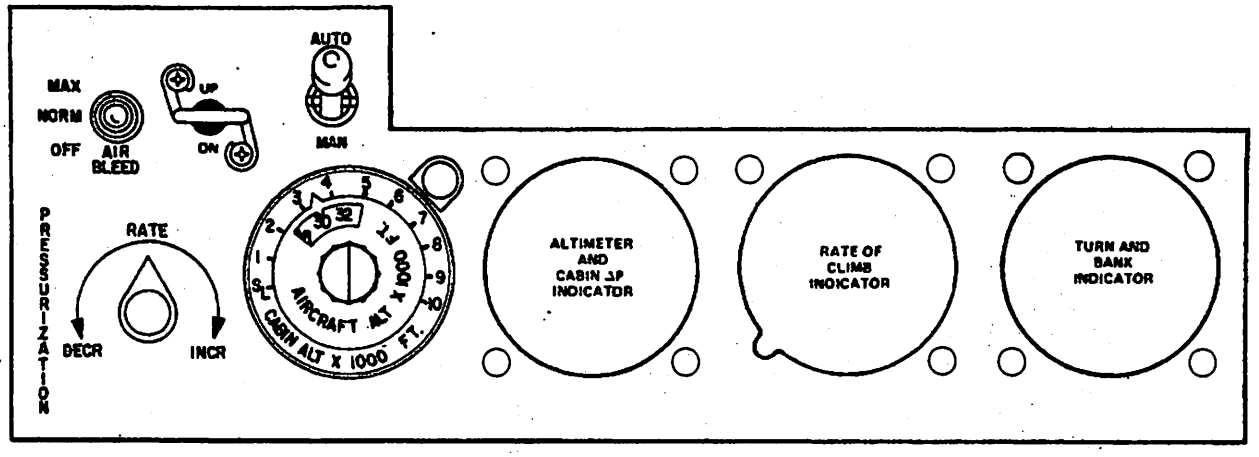
Pressurization Module
Figure 201 (Sheet 3 of 4)

13-64C-7

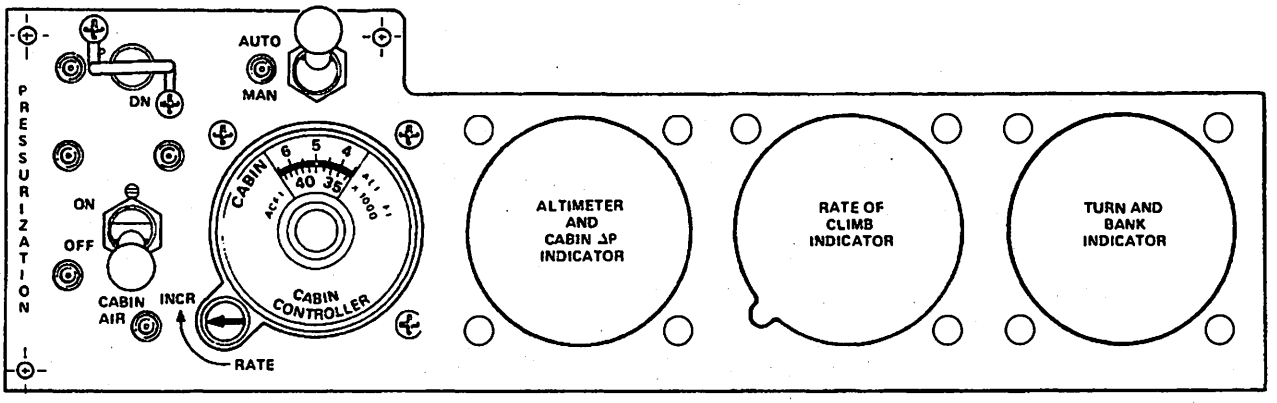


Aircraft 25-319 and Subsequent

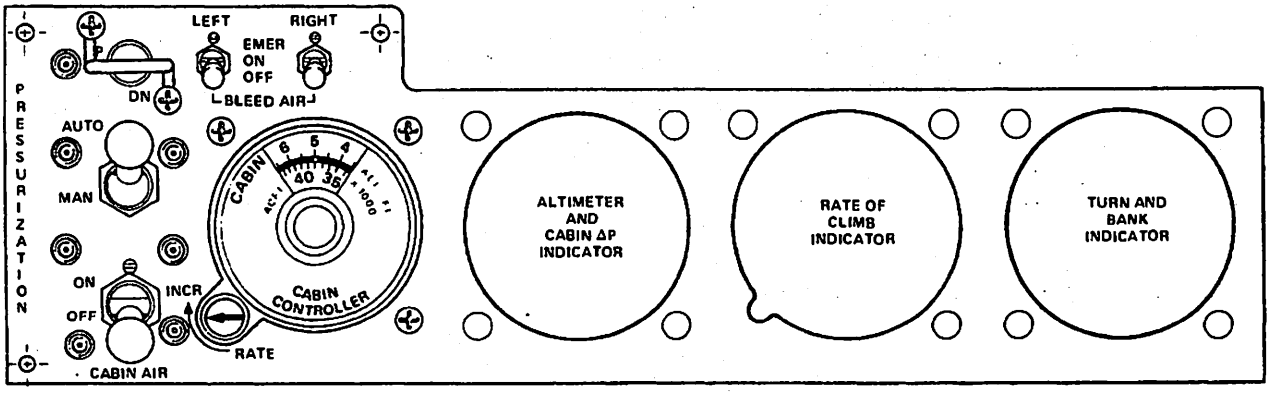
Pressurization Module
Figure 201 (Sheet 4 of 4)



Aircraft 25-061, 25-070 thru 25-226



Aircraft 25-227 thru 25-256



Aircraft 25-257 and Subsequent

Pressurization Module Panel Configurations
Figure 202

2. Functional Test of Cabin Pressurization Module (Aircraft 25-061, 25-070 thru 25-226)

A. Place pressurization module on bench and connect test setup shown in figure 203.

B. Fabricate electrical test fixture according to figure 204 and connect electrical test fixture plug to pressurization module receptacle.

C. Tools and Equipment.

NOTE: Ensure all test equipment is in proper working order. The entire test setup, including hoses to be used, shall be leak tested for zero leakage prior to accomplishing any functional test.

NAME	PART NUMBER	MANUFACTURER	USE
Vacuum Source (20 inches of Hg)		Commercially Available	General
Water Manometer (0 to 12 inches of H_2O)		Commercially Available	General
Mercury Manometer (0 to 31.5 inches of Hg, Absolute)		Commercially Available	General
Mercury Manometer (0 to 31.5 inches of Hg)		Commercially Available	General
Altimeter		Commercially Available	General
Rate-of-Climb Indicator (0 to 6000 fpm)		Commercially Available	General
Vacuum Regulator (5.3 inches of Hg relief)	Garrett P/N 53892-3, Series I	Garrett-AiResearch 2525 W. 190th Street Torrance, Calif. 90509	General
Differential Regulator	Garrett P/N 107312-1, Model PR1-5-1	Garrett-AiResearch 2525 W. 190th Street Torrance, Calif. 90509	General
Orifice (0.040-inch (±0.001) diameter)		Commercially Available	General

NAME	PART NUMBER	MANUFACTURER	USE
Electrical Test Fixture		Fabricate from parts shown in figure 204.	General
Valves with Positive Shutoff (4 Reqd)		Commercially Available	General
Tubing		Commercially Available	General
Stop Watch		Commercially Available	General
Misc. Fittings		Commercially Available	General

NOTE: When performing any of the following functional tests on a pressurization module, a data sheet (See figure 206.) should be utilized in recording test data.

D. Test Setup Leakage
   (1) Prepare a data sheet similar to figure 206.
   (2) Interconnect filter, static, and jet pump (vacuum regulator) connections using a tee fitting. Cover bleed fitting on differential regulator.
   (3) Close bleed and vacuum supply valves V2 and V1. Using vacuum bypass valve V4, establish a 10,000 (±100) feet cabin altitude. Close bypass valve V4. Record altimeter G1 reading.
   (4) After 2 minutes have elapsed, again record altimeter G1 reading. Leakage rate shall not exceed 50 feet per minute.
   (5) Return test setup to ambient pressure at a rate not to exceed maximum rate of rate-of-climb indicator, gage G2.
   (6) Disconnect filter, static, and jet pump (vacuum regulator) lines from tee fitting.

E. Module Leakage
   (1) Remove inflow filter from module. Connect test setup filter (with 0.040-inch orifice), static, and jet pump (vacuum regulator) lines to corresponding ports on module. Install altimeter G3 on cabin air exhaust control valve port of module.
   (2) Select maximum altitude on cabin altitude controller and maximum rate on rate selector. Close bleed and vacuum supply valves V2 and V1. Using vacuum bypass valve V4, establish a 10,000 (±100) foot cabin. Close bypass valve V4. Record altimeter G1 reading.

(3) After 2 minutes have elapsed, again record altimeter G1 reading. Module leakage rate, excluding test setup leakage, shall not exceed 300 feet per minute. Rotate cabin altitude controller and rate selector knobs to ensure no variable O-ring leakage.

NOTE: There will be an altitude fluctuation when the cabin altitude controller is rotated; but will dampen.

(4) Return module and test setup to ambient pressure at a rate not to exceed 3000 feet per minute.

(5) Remove cover from bleed fitting in differential regulator.

F. Cabin Altitude

NOTE: Maximum rate may be selected for the transitions between the following altitude controller reselections.

(1) Cabin Altitude - 2000 Feet Up

(a) Select below-field elevation on cabin altitude controller and maximum rate on rate selector; set switches per condition C of figure 205. Close bleed and vacuum bypass valves V2 and V4, open vacuum supply valve V1.

(b) Select 2000 feet on cabin altitude controller.

NOTE: A short period of time is required to obtain head-to-cabin regulation before cabin altitude will begin to rate up.

(c) Allow cabin altitude to stabilize, record manometer M1 reading on data sheet. (See figure 206.) Manometer reading shall be 27.82 (±0.30) inches Hg. absolute. Also record cabin altitude gage G1 reading on data sheet.

(2) Cabin Reselection Up Transient

(a) Maintain selected 2000 foot cabin altitude. Rotate rate selector 90 degrees clockwise from minimum stop.

(b) Observe actual cabin altitude, gage G1, and rotate cabin altitude controller knob to 5000 feet. Record change in cabin altitude, immediately after reselection, before cabin rates up smoothly (not more than 200 fpm) as indicated on cabin rate-of-climb indicator, gage G2. Rotate rate selector knob to maximum and allow system to rate to 5000 feet.

(3) Cabin Altitude - 5000 Feet Up

(a) Allow cabin altitude to stabilize at 5000 feet selected altitude; record manometer M1 reading on data sheet. (See figure 206.) Manometer reading shall be 24.89 (±0.32) inches Hg. absolute. Record cabin altitude reading shown on cabin altimeter gage G1 on data sheet.

(4) Cabin Reselection Up Transient

(a) Maintain selected 5000 foot cabin altitude. Rotate rate selector knob 90 degrees clockwise from minimum stop.

(b) Observe actual cabin altitude, gage G1, and rotate cabin altitude controller knob to 8000 feet. Record change in cabin altitude on data sheet (See figure 206.) immediately after reselection and before cabin rates up smoothly as indicated on cabin rate-of-climb indicator, gage G2. Cabin altitude shall not change more than 200 feet before smoothly rating up. Rotate rate selector knob to maximum and allow system to rate to 8000 feet.

(5) Cabin Altitude - 8000 Feet Up

(a) Allow cabin altitude to stabilize at 8000 feet selected altitude; record manometer M1 reading on data sheet. (See figure 206.) Manometer reading shall be 22.22 (±0.30) inches Hg. absolute. Record cabin altitude reading shown on cabin altimeter gage G1, on data sheet.

(6) Manual Operation

(a) Set Pressurization AUTO-MAN Switch to MAN position, condition D on figure 205, and slowly move manual cabin altitude control valve to UP position. Altitude on altimeter, G3, shall increase as manual valve is held in UP position. Record direction of altitude change on data sheet. (See figure 206.)

(b) Slowly move manual cabin altitude control valve to DN position. Altitude on gage G3 shall decrease as manual valve is held in DN position. Record direction of altitude change on data sheet.

(c) Return Pressurization AUTO-MAN Switch to AUTO position.

(7) Cabin Reselection Down Transient

(a) Maintain selected 8000 foot cabin altitude. Rotate rate selector knob 90 degrees clockwise from minimum stop.

(b) Observe actual cabin altitude, gage G1, and rotate cabin altitude controller knob to 5000 feet. Record change in cabin altitude on data sheet (See figure 206.) immediately after reselection and before cabin altitude rates down smoothly as indicated on cabin rate-of-climb indicator, gage G2. Cabin altitude shall not change more than 200 feet before smoothly rating down. Rotate rate selector knob to maximum and allow system to rate 5000 feet.

(8) Cabin Altitude - 5000 Feet Down

(a) Allow cabin altitude to stabilize at 5000 feet selected altitude; record manometer M1 reading on data sheet. (See figure 206.) Manometer reading shall be 24.89 (±0.32) inches Hg. absolute. Record cabin altitude shown on cabin altimeter gage G1, on data sheet.

(9) Cabin Reselection Down Transient

(a) Maintain selected 5000 foot cabin altitude. Rotate rate selector knob 90 degrees clockwise from minimum stop.

(b) Observe actual cabin altitude, gage G1, and rotate cabin altitude controller knob to 2000 feet. Record change in cabin altitude on data sheet (See figure 206.) immediately after reselection, as indicated on cabin rate-of-climb indicator, gage G2. Cabin altitude shall not change more than 200 feet before smoothly rating down. Rotate rate selector knob to maximum and allow system to rate to 2000 feet.

(10) Cabin Altitude - 2000 Feet Down

(a) Allow cabin altitude to stabilize at 2000 feet selected altitude; record manometer M1 reading on data sheet. (See figure 206.) Manometer reading shall be 27.82 (±0.36) inches Hg. absolute. Record cabin altitude reading shown on cabin altimeter gage G1, on data sheet.

G. Rate Control

NOTE: Rate controller "buzzing" is acceptable if cabin rate remains within specified limits during functional test.

(1) Maximum Rate

(a) Rotate rate selector knob to maximum position, and select 8000 feet altitude on cabin altitude controller. Measure amount of time required for cabin altimeter, gage G1, to change from 4500 feet to 5500 feet. Convert measured time to rate. Record maximum down rate obtained on data sheet, (See figure 206.) which shall exceed 1250 feet per minute.

(b) Select 2000 feet altitude on cabin altitude controller. Measure amount of time required for cabin altimeter, gage G1, to change from 5500 feet to 4500 feet. Convert measured time to rate. Record maximum down rate obtained on data sheet, which shall exceed 1250 feet per minute.

(2) Nominal Rate

(a) Rotate rate selector knob 90 degrees from minimum stop, and select 8000 feet altitude on cabin altitude controller. Observe altitude change, from an initial altitude of 4500 feet, during a 60-second time period. Record nominal up rate obtained on data sheet. (See figure 206.)

(b) Without changing position of rate selector, select 2000 feet altitude on cabin altitude controller. Observe altitude change, from an initial altitude of 5500 feet, during a 60-second time period. Record nominal down rate obtained on data sheet.

(3) Minimum Rate

(a) Select 8000-foot altitude on cabin altitude controller and select a convenient rate on rate selector. Allow cabin altitude to approach 4500 feet, then select minimum rate selector position. When system stabilizes on minimum rate, observe altitude change on cabin altimeter, gage G1, during a 60-second time period. Record minimum up rate on data sheet, (See figure 206.) which shall not exceed 375 feet per minute.

(b) Rotate rate selector knob to maximum and allow cabin altimeter, gage G1, to approach 5500 feet. Reselect minimum rate selector position and select 2000-foot altitude on cabin altitude selector. When system stabilizes on minimum rate, observe altitude change on cabin altimeter, gage G1, during a 60-second time period. Record minimum down rate on data sheet, which shall not exceed 375 feet per minute.

H. Differential Operation

(1) Rotate rate selector knob to a position 90 degrees from minimum stop and select 2000-feet altitude on cabin altitude controller.

(2) Slowly open bypass valve V4 to allow vacuum to increase at static port of module. Observe cabin-to-atmosphere manometer M3 and record differential pressure on data sheet (See figure 206.) as shown when system begins to operate on differential relief.

NOTE: Cabin altitude will begin to increase as shown on cabin altimeter, G1, and cabin rate-of-climb, G2, when system starts to operate on differential pressure controller.

(3) Increase vacuum supply through valve V4 to increase cabin altitude as shown on gage G1, to 3000 feet. Stabilize cabin altitude and permit cabin rate-of-climb, gage G2, to null.

(4) Slowly close bypass valve V4 to return module to isobaric operation. Rate control should be operational to return system to selected cabin altitude (2000 feet).

(5) Select below-field elevation on altitude selector and allow system to return to room ambient pressure. Close vacuum supply valve V4 and remove module from test setup.

I. Air Bleed Switch Operation

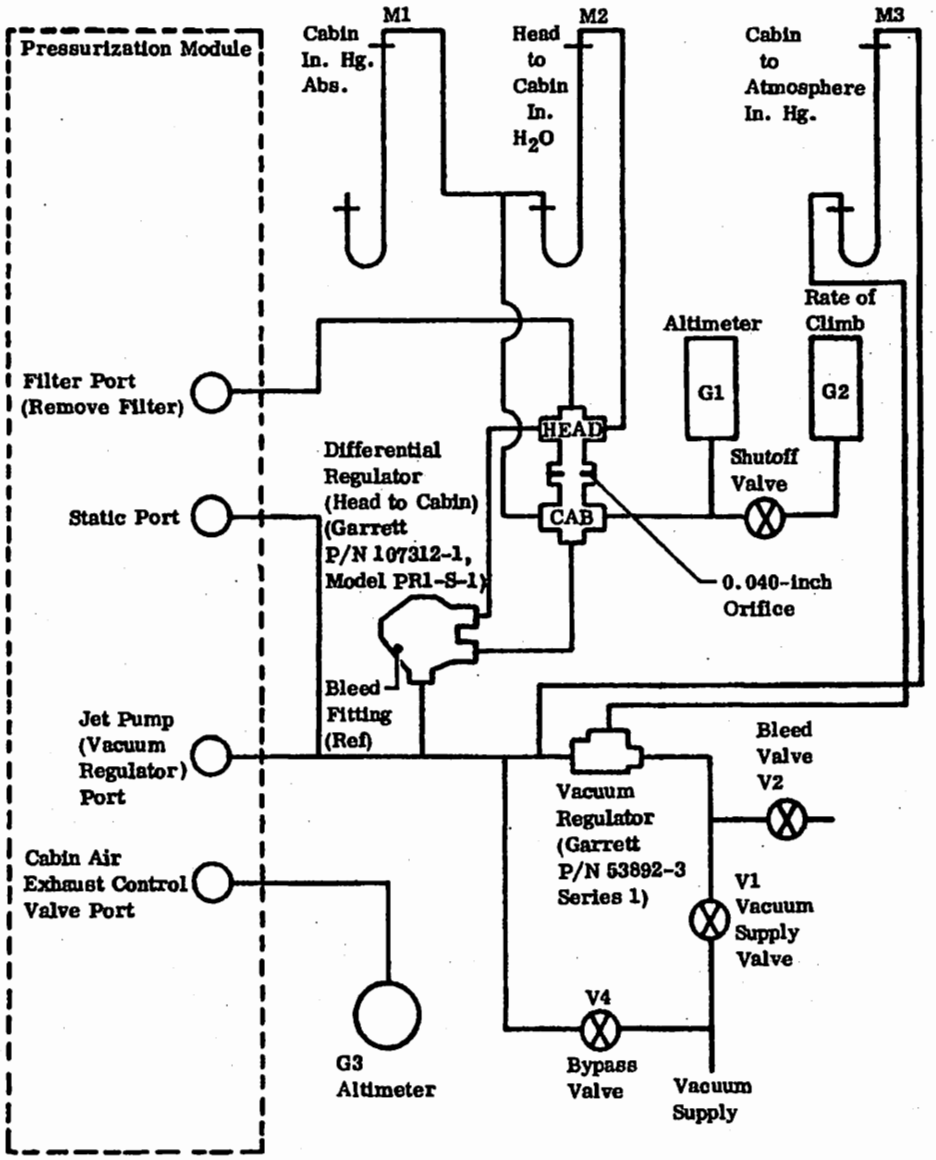
(1) Check that pressurization module is connected to electrical test fixture and DC power is supplied. Set Air Bleed Switch to OFF. OFF indicator light shall illuminate. MAX indicator light shall not illuminate. Record results on data sheet. (See figure 206.)

(2) Set Air Bleed Switch to NORM. Neither indicator light shall illuminate. Record results on data sheet.

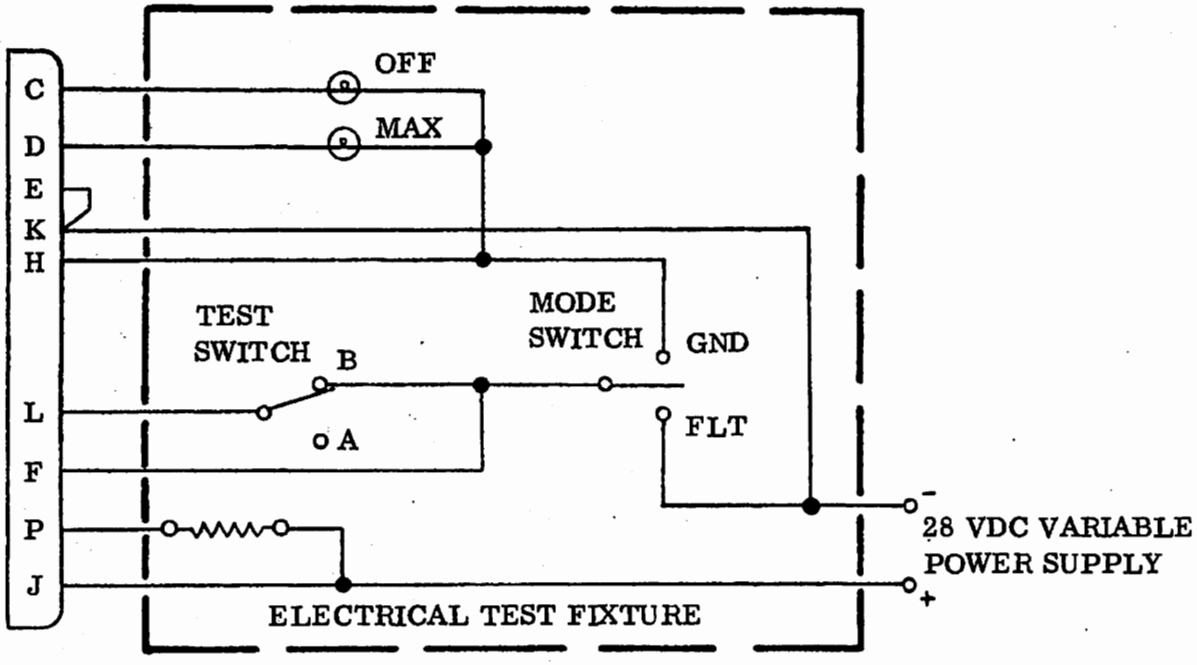
(3) Set Air Bleed Switch to MAX. MAX indicator light shall illuminate. OFF indicator light shall not illuminate. Record results on data sheet.

J. Instrument Lighting

(1) With pressurization module still connected to electrical test fixture and DC power applied, check that all four post lights and all six panel lights are illuminated. Record results on data sheet. (See figure 206.)



Pressurization Module Test Setup Schematic
Figure 203



PARTS LIST

Quantity	Nomenclature	Part Number	Vendor
(2)	Indicator Light	BEP62-CB	Cal-Glo
(1)	Resistor	20 Ω 50 Watts	Ohmite
(1)	Switch (Test)	8810K15	C-H
(1)	Switch (Mode)	8800K16	C-H
(1)	Plug	S800-1TSNR	Learjet
A/R	Wire	AWG 20	Learjet

Electrical Test Fixture Fabrication
Figure 204

COND.	SWITCH POSITION				RESPONSE		
	Cabin	Auto -Man	Mode	Test Switch	N. C. Solenoid Item 1 *	N. O. Solenoid Item 2 *	N. O. Solenoid Item 3 *
A	Norm	Auto	GND	Pos. B	Energized (open)	Energized (closed)	Energized (closed)
B	Norm	Man	GND	Pos. A	De-energized (closed)	Energized (closed)	Energized (closed)
C	Norm	Auto	FLT	Pos. B	De-energized (closed)	De-energized (open)	De-energized (open)
D	Norm	Man	FLT	Pos. B	De-energized (closed)	De-energized (open)	Energized (closed)
E	Norm	Auto	GND	Pos. A	De-energized (closed)	Energized (closed)	Energized (closed)

*Item identification corresponds to item callouts in module test schematic.

Pressurization Module Test Conditions
Figure 205

DATA SHEET

Para.	Test	Required	Actual
2.D.(3)	Setup Leakage	10,000 (±100) feet	_____ feet
2.D.(4)	Setup Leakage	Maximum of 100 feet less than D.(3).	_____ feet
2.E.(2)	Module Leakage	10,000 (±100) feet	_____ feet
2.E.(3)	Module Leakage	Maximum of 600 feet less than E.(2).	_____ feet
2.F.(1)	Cabin Altitude - 2000 feet Up	27.82 (+0.36) inches Hg. Abs. or 2000 (±300) feet	_____ inches Hg. or _____ feet
2.F.(2)	Cabin Reselection Up Transient	200 feet maximum	_____ feet
2.F.(3)	Cabin Altitude - 5000 feet Up	24.89 (±0.32 inches Hg. Abs. or 5000 (±350) feet	_____ inches Hg. or _____ feet
2.F.(4)	Cabin Reselection Up Transient	200 feet maximum	_____ feet
2.F.(5)	Cabin Altitude - 8000 feet Up	22.22 (±0.30) inches Hg. Abs. or 8000 (±350) feet	_____ inches Hg. or _____ feet
2.F.(6)	Manual Operation	Increase	_____
2.F.(7)	Cabin Reselection Down Transient	200 feet maximum	_____ feet
2.F.(8)	Cabin Altitude - 5000 feet Down	24.89 (+0.32) inches Hg. Abs. or 5000 (±350) feet	_____ inches Hg. or _____ feet
2.F.(9)	Cabin Reselection Down Transient	200 feet maximum	_____ feet
2.F.(10)	Cabin Altitude - 2000 feet Down	27.82 (±0.36) inches Hg. Abs. or 2000 (±350) feet	_____ inches Hg. or _____ feet

Pressurization Module Data Sheet
Figure 206 (Sheet 1 of 2)

DATA SHEET

Para.	Test	Required	Actual
2.G.(1)(a)	Maximum Up Rate	Not less than 1250 fpm	_____fpm
2.G.(1)(b)	Maximum Down Rate	Not less than 1250 fpm	_____fpm
2.G.(2)(a)	Nominal Up Rate		_____fpm
2.G.(2)(b)	Nominal Down Rate		_____fpm
2.G.(3)(a)	Minimum Up Rate	Not more than 375 fpm	_____fpm
2.G.(3)(b)	Minimum Down Rate	Not more than 375 fpm	_____fpm
2.H.	Differential Operation	18.10 (±0.25) inches Hg.	_____inches Hg.
2.I.(1)	Bleed Air Switch OFF	OFF Indicator Light On	_____
2.I.(2)	Bleed Air Switch NORM	No Indicator Lights	_____
2.I.(3)	Bleed Air Switch MAX	MAX Indicator Lights On	_____
2.J.(1)	Instrument Lighting	Lights Operate	_____

PART NUMBER_____ DATE_____

MODULE S/N_____ TESTED BY_____

AMBIENT TEMPERATURE_____ INSPECTED BY_____

Pressurization Module Data Sheet
Figure 206 (Sheet 2 of 2)

3. Functional Test of Cabin Pressurization Module (Aircraft 25-227 and Subsequent)

A. Place pressurization module on bench and connect test setup as shown in figure 207.

B. Fabricate electrical test fixture according to figure 208, and connect electrical test fixture plug to pressurization module plug.

C. Tools and Equipment

NOTE: Ensure that all test equipment is in proper working order. The entire test setup, including hoses to be used, shall be leak tested for zero leakage prior to accomplishing any functional test.

NAME	PART NUMBER	MANUFACTURER	USE
Vacuum Source (20 inches of Hg)		Commercially Available	General
Water Manometer (0 to 12 inches of H_2O)		Commercially Available	General
Mercury Manometer (0 to 31.5 inches of Hg, Absolute)		Commercially Available	General
Mercury Manometer (0 to 31.5 inches of Hg)		Commercially Available	General
Altimeter		Commercially Available	General
Rate-of-Climb Indicator (0 to 6000 fpm)		Commercially Available	General
Vacuum Regulator (5.2 inches of Hg relief)	Garrett P/N 53892-3, Series I	Garrett-AiResearch 2525 W. 190th Street Torrance, Calif. 90509	General
Differential Regulator	Garrett P/N 107312-1, Model PR1-5-1	Garrett-AiResearch 2525 W. 190th Street Torrance, Calif. 90509	General
Orifice (0.040-inch (±0.001) diameter)		Commercially Available	General

NAME	PART NUMBER	MANUFACTURER	USE
Electrical Test Fixture		Fabricate from parts shown in figure 208.	General
Valves with Positive Shutoff (4 Reqd)		Commercially Available	General
Tubing		Commercially Available	General
Stop Watch		Commercially Available	General
Misc. Fittings		Commercially Available	General

NOTE: When performing any of the following functional tests on a pressurization module, a data sheet (See figure 209.) should be utilized in recording test data.

D. Test Setup Leakage
   (1) Prepare a data sheet similar to figure 209.
   (2) Interconnect filter, static, and vacuum regulator connections using a tee fitting. Cover bleed fitting on differential regulator. Install caps on cabin air exhaust control valve relief port, differential pressure controller, and two altitude switch ports.
   (3) Close bleed and vacuum supply valves V2 and V1. Using vacuum bypass valve V4, limit rate to not exceed maximum climb rate and establish 10,000 (±100) foot cabin. Close bypass valve V4. Record altimeter G1 reading on data sheet. (See figure 209.)
   (4) After 2 minutes have elapsed, again record altimeter G1 reading on data sheet. Leakage rate shall not exceed 50 feet per minute.
   (5) Return test setup to ambient pressure at a rate not to exceed maximum rate of rate-of-climb indicator, gage G2.
   (6) Disconnect filter, static, and vacuum regulator lines from tee fitting.

E. Cabin Rate Selector Knob Torque
   (1) Torque required to rotate cabin rate selector knob shall not exceed 7.0 inch oz. Read and record torque on data sheet. (See figure 209.)

F. Module Leakage

(1) Remove module inflow filter.

(2) Remove snap ring and screen from cabin air sense port of cabin pressure controller (mini-controller) and insert fitting for connection to test setup.

NOTE: Ensure that fitting does not contact bellows in controller.

(3) Remove screened fittings on altitude switches.

(4) Connect test setup, static, and vacuum regulator lines to corresponding ports on module. Connect cabin pressure controller (mini-controller) and pressure switches to cabin manifold.

(5) Connect cabin air exhaust control valve port of module to head of test setup and to altimeter G3.

(6) Close valve V5.

(7) Select maximum altitude on cabin altitude controller and maximum rate on rate selector. Close bleed and vacuum supply valves V2 and V1. Using vacuum bypass valve V4, limit rate to not exceed maximum climb rate and establish a 10,000 (±100) foot cabin. Close bypass valve V4 and cabin altitude port. Record altimeter G1 reading on data sheet. (See figure 209.)

(8) After 2 minutes have elapsed, again record altimeter G1 reading on data sheet. Module leakage rate, excluding test setup leakage, shall not exceed 300 feet per minute.

(9) Remove cover from bleed fitting in differential (head-to-cabin) regulator, and open vacuum supply.

(10) Return module and test setup to ambient pressure at a rate not to exceed 300 feet per minute.

G. Isobaric Control Test

(1) Cabin Altitude - 2000 Feet Up

(a) Select below-field elevation on cabin altitude controller and maximum rate on rate selector. Close bleed and vacuum bypass valves V2 and V4; open vacuum supply valve V1.

(b) Select 2000 feet on cabin altitude controller.

NOTE: A short period of time is required to obtain head-to-cabin regulation before cabin altitude will begin to rate up.

(c) Allow cabin altitude to stabilize; record manometer M1 reading on data sheet. (See figure 209.) Manometer reading shall be 27.82 (±0.36) inches Hg. absolute. Also record cabin altitude gage G1 reading, on data sheet.

NOTE: After determining reselection transients using nominal rate selection, maximum rate may be selected for transition between the following altitude controller reselections.

(2) Cabin Reselection Up Transient

(a) Maintain selected 2000-foot cabin altitude. Rotate rate selector knob to 9 o'clock position.

(b) Observe actual cabin altitude, gage G1, and rotate cabin altitude controller knob to 5000 feet. Record change in cabin altitude on data sheet (See figure 209.) immediately after reselection and before cabin rates up smoothly as indicated on cabin rate-of-climb indicator, gage G2. There shall not be more than a 200-foot change in cabin altitude between time of reselection and time when the cabin begins a steady climb rate.

NOTE: As soon as a steady and amooth rate of climb has been established and verified, maximum rate may be reselected to continue to 5000-foot cabin altitude.

(3) Cabin Altitude - 5000 Feet Up

(a) Allow cabin altitude to stabilize at 5000-foot selected altitude; record manometer M1 reading on data sheet (See figure 209.) Manometer reading shall be 24.89 (±0.32) inches Hg. absolute. Record cabin altitude reading shown on cabin altimeter gage G1, on data sheet.

(4) Cabin Reselection Up Transient

(a) Maintain selected 5000-foot altitude. Rotate rate selector to 9 o'clock position.

(b) Observe actual cabin altitude reading, gage G1, and rotate cabin altitude controller knob to 8000 feet. Record change in cabin altitude on data sheet (See figure 209.) immediately after reselection and before cabin climbs smoothly as indicated on cabin rate-of-climb indicator, gage G2. There shall not be more than a 200-foot change in cabin altitude between time of reselection and time when cabin begins a steady climb rate.

(5) Cabin Altitude - 8000 Feet Up

(a) Allow cabin altitude to stabilize at 8000-foot selected altitude; record manometer M1 reading on data sheet. (See figure 209.) Manometer reading shall be 22.22 (±0.30) inches Hg. absolute. Record cabin altitude reading shown on cabin altimeter gage G1, on data sheet.

(6) Manual Operation

CAUTION: CAUTION MUST BE TAKEN IN MANUAL OPERATION NOT TO EXCEED CABIN RATE-OF-CLIMB INDICATOR RANGE.

(a) Rotate rate selector knob to 9 o'clock position and select 9,500 feet on cabin altitude controller. Allow cabin to rate upward until S3 switch actuates. Lamp shall illuminate and rate decrease to less than 200 feet per minute. Record switch point on data sheet. (See figure 209.)

(b) Set Pressurization AUTO-MAN Switch to MAN and slowly move cabin altitude control valve knob to UP position. The cabin altitude shall be increased until lamp illuminates, indicating altitude switch S4 has actuated. Record switch point on data sheet.

(c) Move manual cabin altitude control valve knob to full UP position and record cabin altitude reading at which altitude limit control functions.

(d) Slowly move manual cabin altitude control valve knob to DN position. The altitude reading on gage G3 shall decrease. Record direction of altitude change on data sheet.

(e) Reselect 7000 feet on cabin altitude controller and maximum rate of rate selector; manually toggle down cabin altitude to 7000 feet at a rate of less than 3000 feet per minute. Allow instrumentation to stabilize.

(f) Set Pressurization AUTO-MAN Switch to AUTO.

(7) Cabin Reselection Down Transient

(a) Maintain selected 7000-foot cabin. Rotate rate selector knob to 9 o'clock position.

(b) Observe actual cabin altitude reading, gage G1, and rotate cabin altitude controller knob to 5000 feet. Record change in cabin altitude on data sheet (See figure 209.) immediately after selection and before cabin altitude rates down smoothly as indicated on cabin rate-of-climb indicator, gage G2. Cabin altitude shall not change more than 200 feet before smoothly rating down. Rotate rate selector knob to maximum and allow system to rate to 5000 feet.

(8) Cabin Altitude - 5000 Feet Down

(a) Allow cabin altitude to stabilize at 5000-foot selected altitude; record manometer M1 reading on data sheet. (See figure 209.) Manometer reading shall be 24.89 (±0.32) inches Hg. absolute. Record cabin altitude reading shown on cabin altimeter gage G1, on data sheet.

(9) Cabin Reselection Down Transient

(a) Maintain selected 5000-foot cabin. Rotate rate selector knob to 9 o'clock position.

(b) Observe actual cabin altitude reading, gage G1, and rotate cabin altitude controller knob to 2000 feet. Record change in cabin altitude on data sheet (See figure 209.) immediately after reselection, as indicated on cabin rate-of-climb indicator, gage G2. Cabin altitude shall not change more than 200 feet before smoothly rating down. Rotate rate selector to maximum and allow system to rate to 2000 feet.

(10) Cabin Altitude - 2000 Feet Down

(a) Allow cabin altitude to stabilize at 2000-foot selected altitude; record manometer M1 reading on data sheet (See figure 209.) Manometer reading shall be 27.82 (±0.36) inched Hg. absolute. Record cabin altitude shown on cabin altimeter gage G1, on data sheet.

H. Rate Control

(1) Maximum Rate

(a) Rotate rate selector knob to maximum position and select 8000-foot cabin altitude on cabin altitude controller. Measure amount of time required for cabin altimeter, gage G1, to change from 4500 feet to 5500 feet. Convert measured time to rate. Record maximum up rate obtained on data sheet (See figure 209.), which shall not exceed 2500 (±500) feet per minute.

(2) Nominal Rate

(a) Rotate rate selector knob to 9 o'clock position. Observe altitude change, from an initial 4500 feet, during a 60-second time period. Record nominal up rate on data sheet (See figure 209.), which shall not exceed 500 (±150) feet per minute.

(b) Without changing position of rate selector, select 2000-foot altitude on cabin altitude controller. Observe altitude change, from an initial 5500 feet, during a 60-second time period. Record nominal down rate on data sheet, which shall not exceed 500 (±150) feet per minute.

(3) Minimum Rate

(a) Select 8000-foot altitude on cabin altitude controller and 9 o'clock position on rate selector. Allow cabin altitude to approach 4500 feet, then select minimum rate selector position. When system stabilizes on minimum rate, observe altitude change on cabin altimeter, gage G1, during a 60-second time period. Record minimum up rate on data sheet (See figure 209.) which shall not exceed 175 (±125) feet per minute.

(b) Rotate rate selector knob to maximum and allow cabin altimeter, gage G1, to approach 5500 feet. Rotate rate selector knob to minimum position and select 2000-foot cabin altitude on cabin altitude controller. When system stabilizes on minimum rate, observe altitude change on cabin altimeter, gage G1, during a 60-second time period. Record minimum down rate on data sheet, which shall not exceed 175 (±125) feet per minute.

I. Differential Operation

(1) Rotate rate selector knob to 9 o'clock position and select 2000-foot altitude on cabin altitude controller.

(2) Slowly open bypass valve V4 to allow vacuum to increase at static port of module. Observe cabin-to-atmosphere manometer M3 and record differential pressure value shown on manometer M3 on data sheet (See figure 209.) when system begins to operate on differential relief.

NOTE: The cabin altitude will begin to increase as shown on cabin altimeter G1 and cabin rate-of-climb G2 when system starts to operate on differential pressure controller.

(3) Increase vacuum supply through valve V4 to increase cabin altitude, as shown on gage G1, to 3000 feet. Stabilize cabin altitude and permit cabin rate-of-climb gage G2 to null.

(4) Slowly close bypass valve V4 to return module to isobaric operation. Rate control should be operational to return system to selected cabin altitude (2000 feet).

(5) Select below-field elevation on altitude controller and allow system to return to room ambient pressure. Close vacuum supply valve V4 and remove module from test setup.

J. Bleed Air Switch Operation (Aircraft 25-227 thru 25-256)

(1) Check that pressurization module is connected to electrical test fixture (See figure 207.) and DC power is supplied. Set Cabin Air Switch to OFF. OFF indicator light shall illuminate. MAX indicator light shall not illuminate.

(2) Set Cabin Air Switch to MAX. MAX indicator light shall illuminate. OFF indicator light shall not illuminate.

(3) Record results on data sheet. (See figure 206.)

K. Bleed Air Switch Operation (Aircraft 25-227 and Subsequent)

(1) Set left Bleed Air Switch (S5) to OFF. Pin lamp A2 is on; B2 and D2 are off.

(2) Set left Bleed Air Switch (S5) to ON. Pin lamp A2 shall extinguish; B2 shall illuminate; D2 remains off.

(3) Set left Bleed Air Switch (S5) to EMERG. Pin lamp S2 remains off; B2 extinguishes.

(4) Set switch (S10) on test fixture to ON. See figure 208.

(5) Set right Bleed Air Switch (S6) to OFF. Pin lamp F will illuminate. Pin lamp R1 will be off.

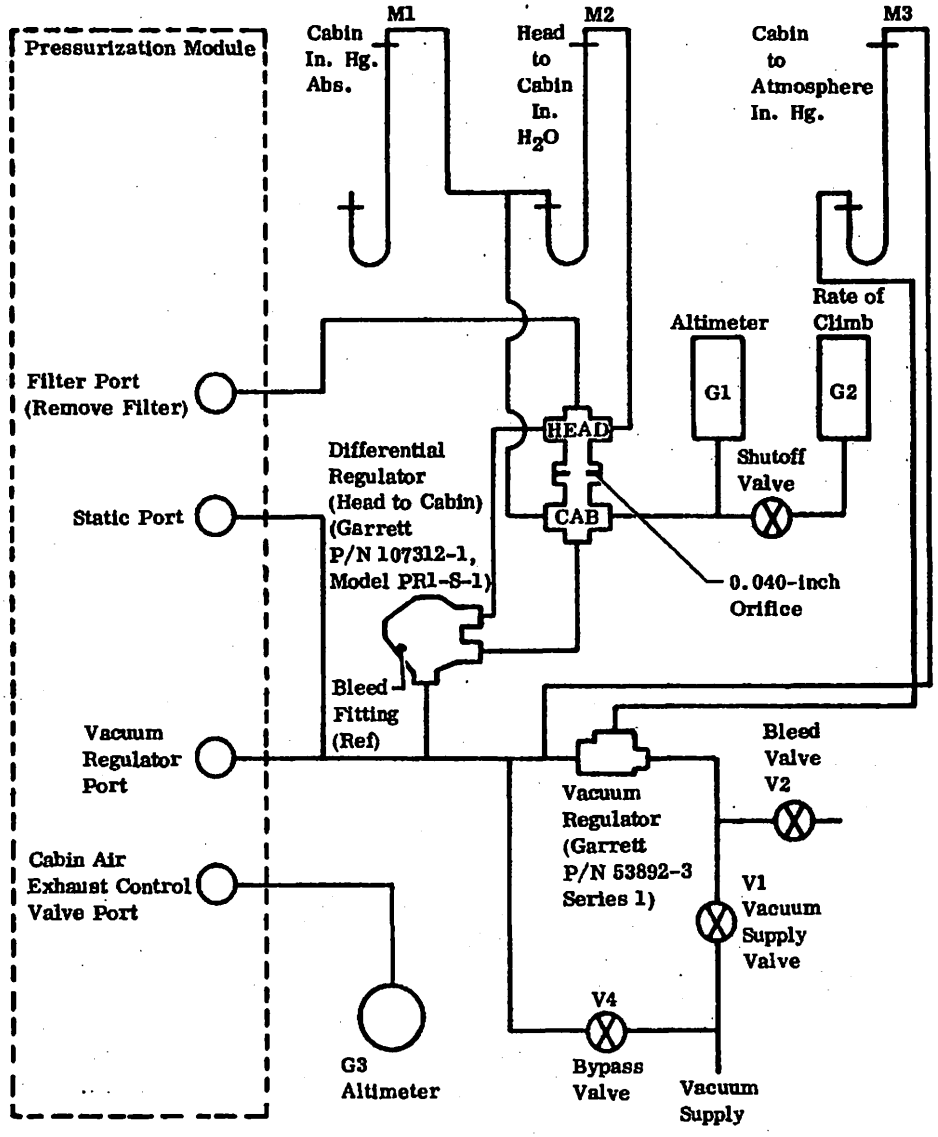
(6) Set right Bleed Air Switch (S6) to ON. Pin lamp F will extinguish. Pin lamp R1 will illuminate.

(7) Set right Bleed Air Switch (S6) to EMERG. R1 pin lamp shall extinguish, and F pin lamp will remain off.

(8) Record results on data sheet. (See figure 206.)

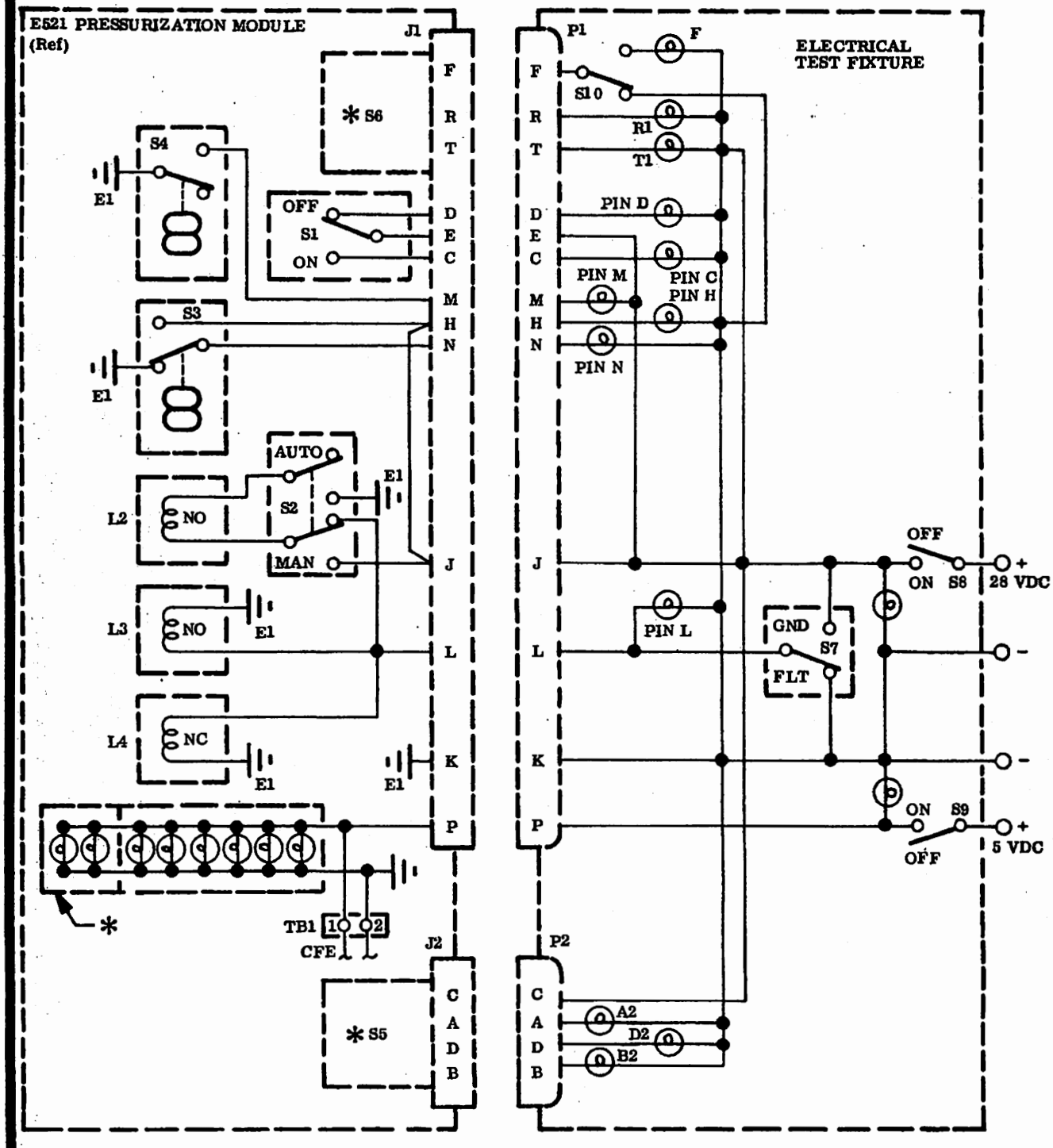
L. Instrument Lighting (Aircraft 25-227 and Subsequent)

(1) With pressurization module still connected to electrical test fixture and DC power applied, check that lights on all instruments and overlays are illuminated. Record results on data sheet. (See figure 206.)



Pressurization Module Test Setup Schematic
Figure 207

* Aircraft 24-257 and Subsequent



Electrical Test Fixture Fabrication
Figure 208 (Sheet 1 of 2)

PARTS LIST

Quantity	Nomenclature	Part Number	Vendor
(13)	Indicator Light (28 vdc)	BEP62-RB* (28 vdc replacement bulbs - #62)	Cal-Glo
(1)	Indicator Light (5 vdc)	BEP62-BB* (5 vdc replacement bulbs - #715)	Cal-Glo
(1)	Switch (S10)	8810K15	C-H
(1)	Switch (S7)	8810K16	C-H
(2)	Switch (S8 & S9)	7580K7	C-H
(1)	Plug	S800-1TS NR	Learjet
(1)	Plug	M4S-LSH10C	Winchester
A/R	Wire	AGW 20	Learjet

*Optional bulb color: RB - Red Bulb
BB - Blue Bulb
GB - Green Bulb
YB - Yellow Bulb

Electrical Test Fixture Fabrication
Figure 208 (Sheet 2 of 2)

DATA SHEET

Para.	Test	Required	Actual
3.D.(3)	Setup Leakage	10,000 (±100) feet	_____feet
3.D.(4)	Setup Leakage	Maximum of 100 feet less than D.(3).	_____feet
3.E.(1)	Cabin Rate Selector Knob Torque	7.0 inch-oz. (maximum)	_____inch-oz.
3.F.	Module Leakage	10,000 (±100) feet	_____feet
3.F.	Module Leakage	Maximum of 600 feet less than E.(2).	_____feet
3.G.(1)	Cabin Altitude - 2000 Feet Up	27.82 (±0.36) inches Hg. Abs. or 2000 (±350) feet	_____inches Hg. or _____feet
3.G.(2)	Cabin Reselection Up Transient	200 feet maximum	_____feet
3.G.(3)	Cabin Altitude - 5000 Feet Up	24.89 (±0.32) inches Hg. Abs. or 5000 (±350) feet	_____inches Hg. or _____feet
3.G.(4)	Cabin Reselection Up Transient	200 feet maximum	_____feet
3.G.(5)	Cabin Altitude - 8000 Feet Up	22.22 (±0.30) inches Hg. Abs. or 8000 (±350) feet	_____inches Hg. _____feet
3.G.(6)(a)	S3 Switch Setting	8750 (±250) feet	_____feet
3.G.(6)(b)	S4 Switch Setting	10100 (±250) feet	_____feet
3.G.(6)(c)	Altitude Limiter Setting	11500 (±1500) feet	_____feet
3.G.(7)	Cabin Reselection Down Transient	200 feet Maximum	_____feet
3.G.(8)	Cabin Altitude - 5000 Feet Down	24.89 (±0.32) inches Hg. Abs.	_____inches Hg. or _____feet
3.G.(9)	Cabin Reselection Down Transient	200 feet maximum	_____feet
3.G.(10)	Cabin Altitude - 2000 Feet Down	27.82 (±0.36) inches Hg. Abs. or 2000 (±350) feet	_____inches Hg. or _____feet

Pressurization Module Data Sheet
Figure 209 (Sheet 1 of 2)

DATA SHEET

Para.	Test	Required	Actual
3.H.(1)(a)	Maximum Up Rate	2500 (±500) fpm	_____ fpm
3.H.(1)(b)	Maximum Down Rate	2500 (±500) fpm	_____ fpm
3.H.(2)(a)	Nominal Up Rate	500 (±150) fpm	_____ fpm
3.H.(2)(b)	Nominal Down Rate	500 (±150) fpm	_____ fpm
3.H.(3)(a)	Minimum Up Rate	175 (±125) fpm	_____ fpm
3.H.(3)(b)	Minimum Down Rate	175 (±125) fpm	_____ fpm
3.I.	Differential Operation	19.10 (±0.15) inches Hg.	_____ inches Hg.
3.J.(1)	Cabin Air Switch OFF	OFF Indicator Light ON	_____
3.J.(2)	Cabin Air Switch MAX	MAX Indicator Light ON	_____
3.K.(1)	Switch S5 OFF	Lamp A2 ON Lamp B2 OFF Lamp D2 OFF	_____ _____ _____
3.K.(2)	Switch S5 ON	Lamp A2 OFF Lamp B2 ON Lamp D2 OFF	_____ _____ _____
3.K.(3)	Switch S5 EMERG	Lamp A2 OFF Lamp B2 OFF	_____ _____
3.K.(5)	Switch S6 OFF	Lamp F ON Lamp R1 OFF	_____ _____
3.K.(6)	Switch S6 ON	Lamp F OFF Lamp R1 ON	_____ _____
3.K.(7)	Switch S6 EMERG	Lamp F OFF Lamp R1 OFF	_____ _____
3.L.(1)	Instrument	Lights Operate	_____

PART NUMBER _____ DATE _____

MODULE S/N _____ TESTED BY _____

AMBIENT TEMPERATURE _____ INSPECTED BY _____

Pressurization Module Data Sheet
Figure 209 (Sheet 2 of 2)

CABIN AIR EXHAUST CONTROL VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

WARNING: ALL MAINTENANCE WORK SHOULD BE DONE IN A CLEAN ENVIRONMENT TO HELP MAINTAIN THE INTEGRITY OF THE SYSTEM. WHEN ANY TUBE OR HOSE ASSEMBLY IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ASSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED AND IDENTIFIED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE A SYSTEM MALFUNCTION.

CAUTION: ALL FITTINGS THAT MATE TO PLASTIC COMPONENTS SHALL BE TORQUED 15 (±5) INCH-POUNDS. WHEN ATTACHING A TUBE OR HOSE ASSEMBLY TO AN ADAPTER FITTING LOCATED IN A PLASTIC COMPONENT, HOLD ADAPTER FIRMLY IN PLACE WITH WRENCH BEFORE APPLYING APPROPRIATE TORQUE TO TUBE OR HOSE ASSEMBLY FITTING. (Refer to Chapter 20.)

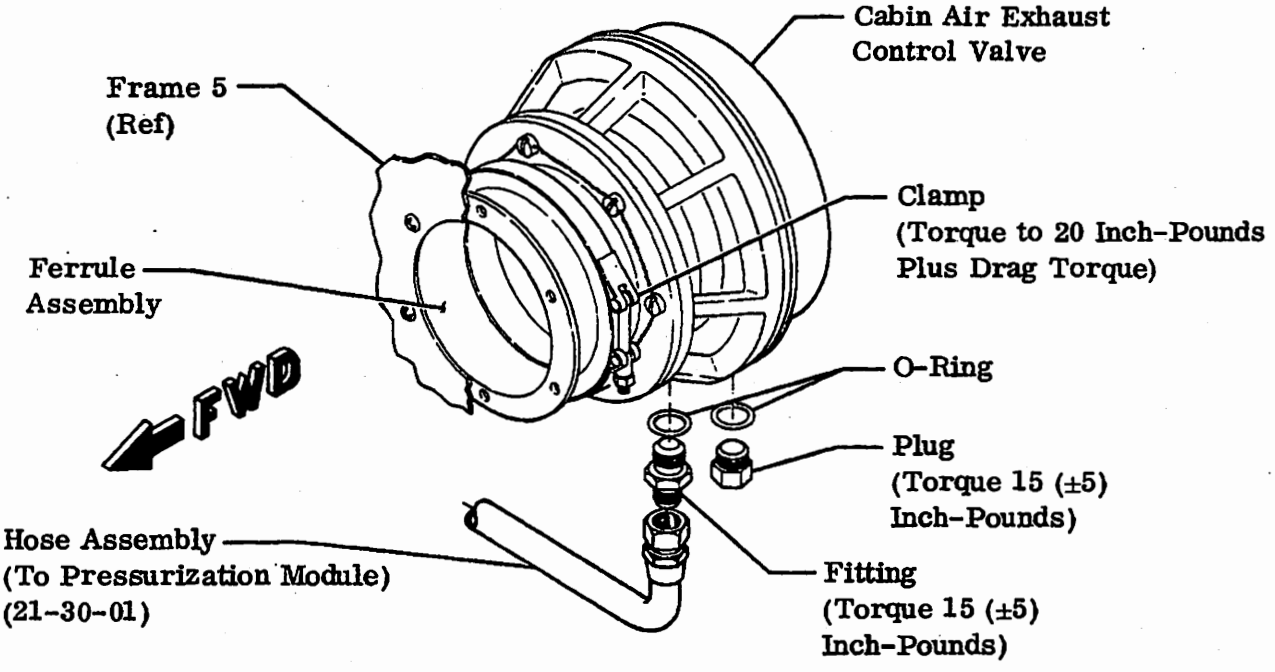
A. Remove Cabin Air Exhaust Control Valve (See figure 201.)
   (1) Lower copilot's subpanel.
   (2) Disconnect hose assembly from cabin air exhaust control valve fitting and cap exposed openings.
   (3) Loosen clamp or nut assembly on cabin air exhaust control valve adapter, and remove valve from aircraft.
   (4) Remove adapter O-ring and inspect for any damage.

B. Install Cabin Air Exhaust Control Valve (See figure 201.)
   (1) Position O-ring and cabin air exhaust control valve on adapter assembly. Secure with clamp or nut assembly.

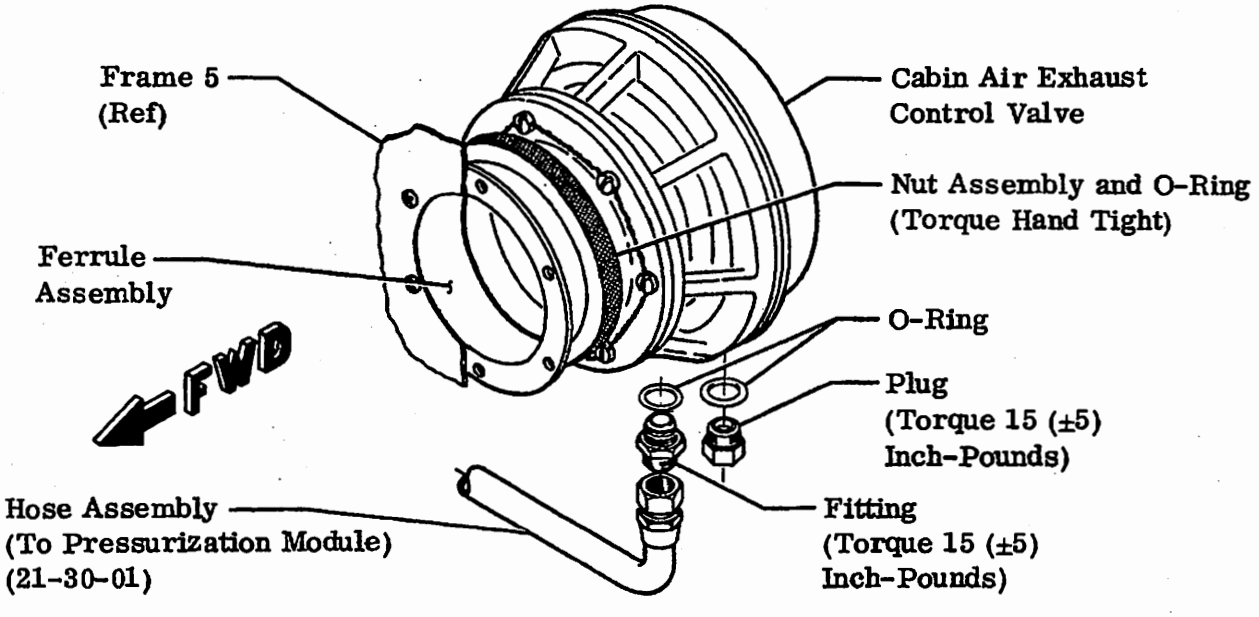
   NOTE: Tighten clamp (Aircraft 25-061, 25-070 thru 25-077 except 25-072 and 25-073), to 20 inch-pounds plus drag torque. Tighten nut assembly (Aircraft 25-072, 25-073, 25-078 and Subsequent), hand tight.

   (2) Remove caps from openings and connect hose to cabin air exhaust control valve.
   (3) Secure cabin air exhaust control valve fitting firmly in place; torque hose assembly fitting to its appropriate value.
   (4) Visually inspect installation to ensure components are installed properly.
   (5) Raise copilot's subpanel.
   (6) Perform operational check of pressurization system. (Refer to 21-30-00.)

NOTE: Drag torque is the amount of torque required to overcome the friction of the self-locking nuts.



Aircraft 25-061, 25-070 thru 25-077 except 25-072 and 25-073



Aircraft 25-072, 25-073, 25-078 thru 25-226

Cabin Air Exhaust Control Valve Installation
Figure 201 (Sheet 1 of 2)

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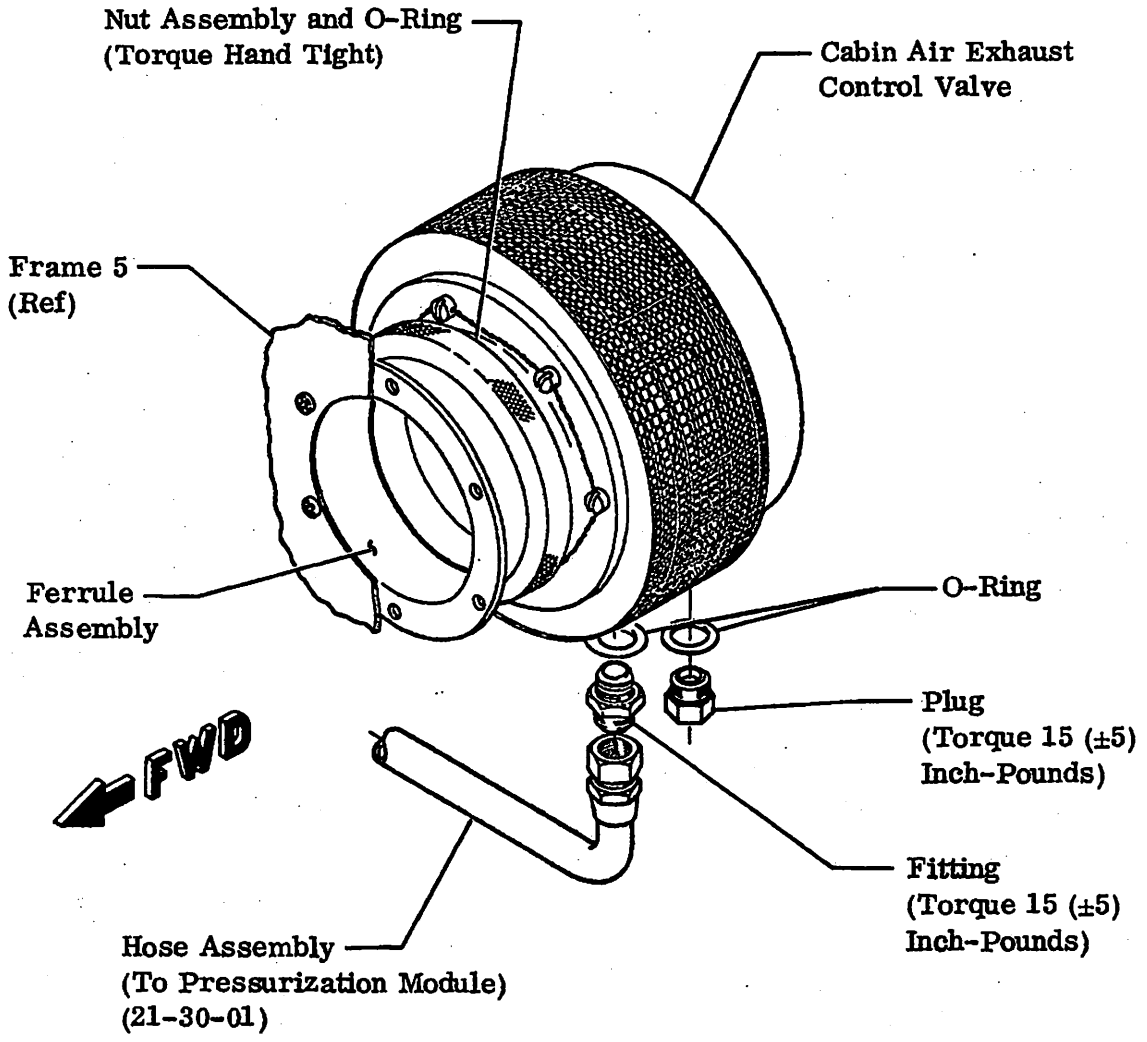


Aircraft 25-227 and Subsequent.

Cabin Air Exhaust Control Valve Installation
Figure 201 (Sheet 2 of 2)

12-65B

2. Cleaning/Painting

A. Clean Cabin Air Exhaust Control Valve (See figure 202.)

WARNING: DO NOT USE MEK OR OTHER HYDROCARBONS BASE SOLVENTS ON COMPONENTS OR SURFACES MADE OF PLASTIC.

CAUTION: DO NOT DISASSEMBLE CABIN AIR EXHAUST CONTROL VALVE ASSEMBLY FOR CLEANING AS THIS WILL VOID ANY WARRANTY AND MAY HAMPER THE INTEGRITY OF THE VALVE ASSEMBLY.

NOTE: Remove and clean cabin air exhaust control valve in accordance with the inspection interval specified in Chapter 5.

(1) Remove cabin air exhaust control valve. (Refer to Removal/Installation and perform steps 1.A.(1) thru 1.A.(4).)

CAUTION:
- HEAVILY CONTAMINATED VALVES MUST BE SOAKED IN CLEANING AGENT FOR A PERIOD OF TIME TO REMOVE EXCESS CONTAMINANTS PRIOR TO COMPLETION OF CLEANING PROCEDURES.
- DO NOT ALLOW CLEANING AGENT TO ENTER THROUGH CABIN PRESSURE INLET HOLES IN VALVE POPPET ASSEMBLY.

(2) Place valve in pan of isopropyl alcohol or a mild detergent and water to soak. For initial soaking, the valve poppet will be closed instead of open as shown in figure 202.

(3) After removing excess contaminants and using a No. 30 (1/8 inch) drill bit, insert blunt end of drill bit into shank end of valve center core port and push valve poppet to open position (approximately one inch). Cap the valve fitting to retain vacuum in control chamber. This will hold the valve open when the drill bit is removed.

CAUTION: VALVE MUST BE MONITORED TO ASSURE THAT VALVE POPPET DOES NOT SLOWLY CLOSE WHILE SETTING IN CLEANING AGENT. ANY SMALL LEAKAGE, EITHER FROM CAPPED VALVE FITTINGS OR INTERNAL LEAKAGE, WILL ALLOW THE VALVE POPPET TO SLOWLY CLOSE AND ALLOW CLEANING AGENT TO ENTER THE CABIN PRESSURE INLET HOLES.

(4) Place valve in a pan of isopropyl alcohol or a mild detergent and water as shown in figure 202. Monitor valve poppet assuring that is stays open.

CAUTION:
- CLEANING AGENT LEVEL SHOULD NOT BE ABOVE LEVEL AS ILLUSTRATED WHEN VALVE ASSEMBLY IS IMMERSED.
- DO NOT ALLOW CLEANING AGENT TO ENTER THROUGH CABIN PRESSURE INLET HOLES IN VALVE POPPET ASSEMBLY.

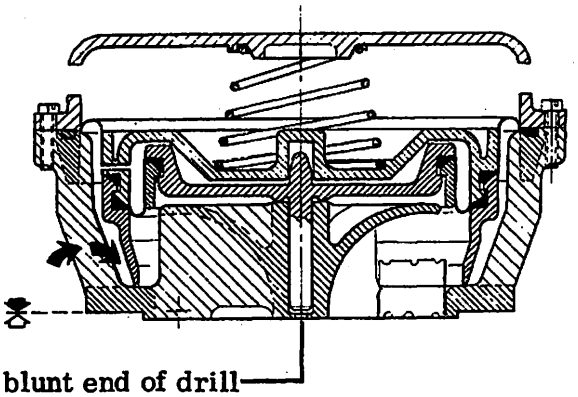
(5) Soak valve in cleaning agent enough to loosen or remove contaminants.

NOTE: A cotton swab or acid brush may be used to scrub the noise suppression screen, poppet, and etc. if required. Pay particular attention to valve poppet assembly and valve poppet seating areas.

(6) Perform a visual inspection of cabin air exhaust control valve to ensure that diaphragm retention ring has not separated from valve poppet assembly (see figure 202), and that poppet assembly is seating properly. Replace cabin air exhaust control valve if necessary.

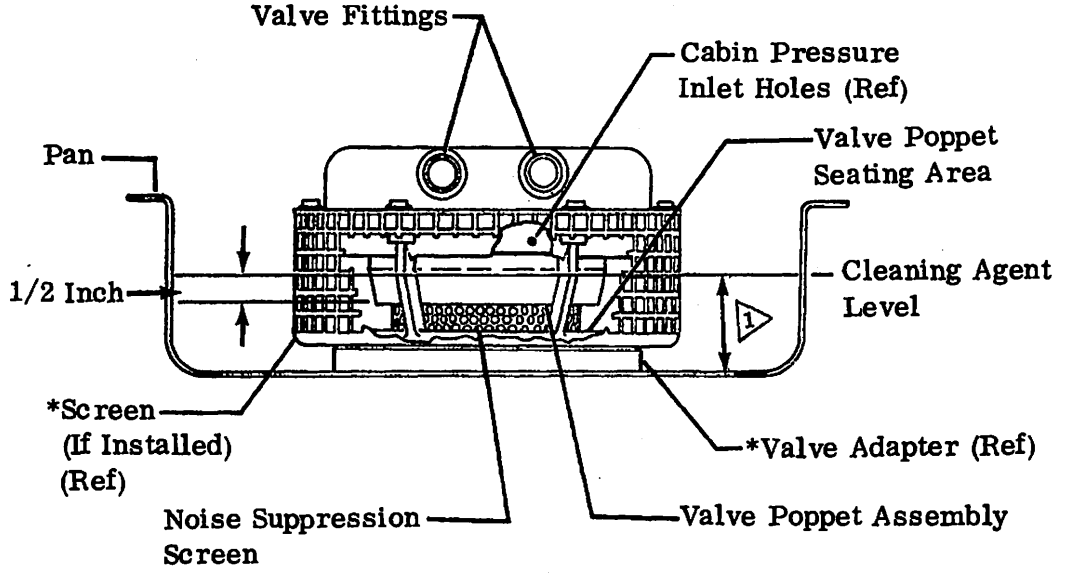
(7) Install cabin air exhaust control valve.

* Valve screen (if installed) and valve adapter shall not be removed from valve assembly.



Insert blunt end of drill bit at this point.

1 Cleaning agent level will vary due to the type of valve adapter installed. Cleaning agent level must be adjusted so that the valve poppet assembly is immersed at least 1/2 inch in cleaning agent. Cleaning agent must not enter the cabin pressure inlet holes.



Valve Shown Partially Open

Cabin Air Exhaust Control Valve Cleaning
Figure 202

CABIN SAFETY VALVE - MAINTENANCE PRACTICES

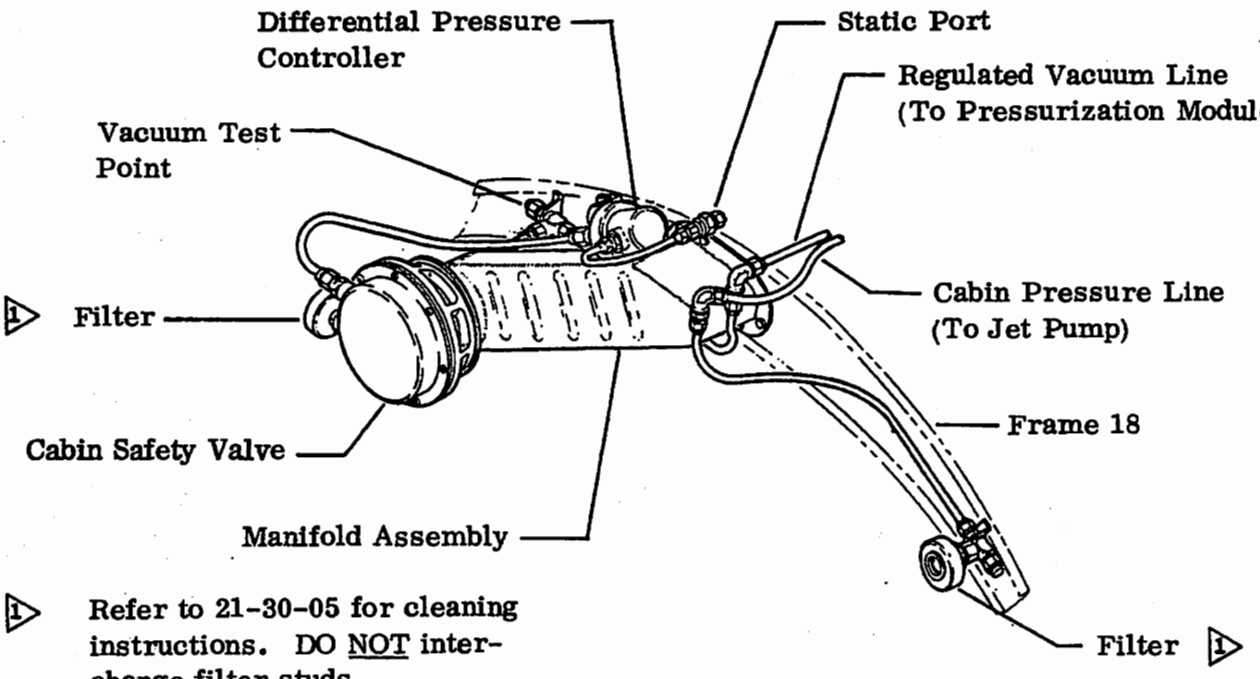
1. Removal/Installation

WARNING: ALL MAINTENANCE WORK SHOULD BE DONE IN A CLEAN ENVIRONMENT TO HELP MAINTAIN THE INTEGRITY OF THE SYSTEM. WHEN ANY TUBE OR HOSE ASSEMBLY IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ASSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED AND IDENTIFIED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE A SYSTEM MALFUNCTION.

CAUTION: ALL FITTINGS THAT MATE TO PLASTIC COMPONENTS SHALL BE TORQUED 15 (±5) INCH-POUNDS. WHEN ATTACHING A TUBE OR HOSE ASSEMBLY TO AN ADAPTER FITTING LOCATED IN A PLASTIC COMPONENT, HOLD ADAPTER FIRMLY IN PLACE WITH WRENCH BEFORE APPLYING APPROPRIATE TORQUE TO TUBE OR HOSE ASSEMBLY FITTING. (Refer to Chapter 20.)

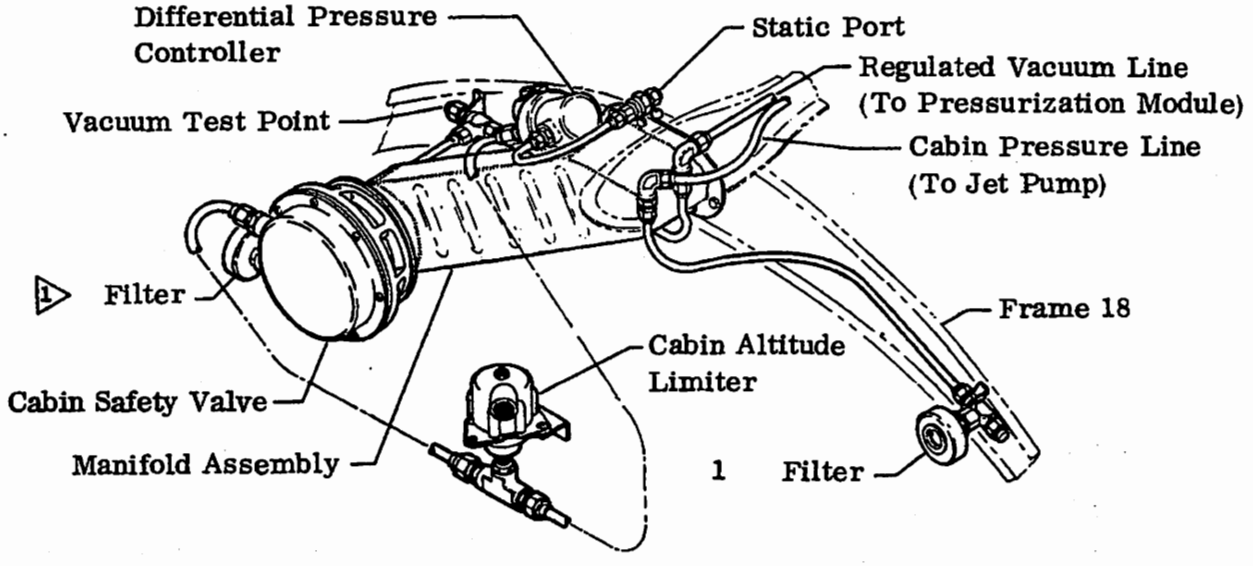
A. Remove Cabin Safety Valve (See figure 201.)
   (1) Remove upholstery from RH side of baggage compartment.
   (2) Disconnect static line and air filter assembly from cabin safety valve, and cap exposed openings.
   (3) Remove attaching parts and cabin safety valve from aircraft.
   (4) Clean old sealant from mating surfaces with isopropyl alcohol or a mild detergent and water.

B. Install Cabin Safety Valve (See figure 201.)
   (1) Ensure mating surfaces on cabin safety valve and manifold assembly are clean.
   (2) Apply parting agent to mating surfaces per Faying Surface Sealing in Chapter 20.
   (3) Apply a removable faying surface seal to cabin safety valve mating surface.
   (4) Install cabin safety valve and secure with attaching parts.
   (5) Visually inspect installation to ensure components are installed properly.
   (6) Remove caps from openings and connect static line and air filter assembly to cabin safety valve.
   (7) Secure cabin safety valve fittings firmly in place; torque static line fitting and air filter assembly to their appropriate values. (Refer to Chapter 20.)
   (8) Install baggage compartment upholstery.
   (9) Perform operational check of pressurization system. (Refer to 21-30-00.)



1 Refer to 21-30-05 for cleaning instructions. DO NOT interchange filter studs.

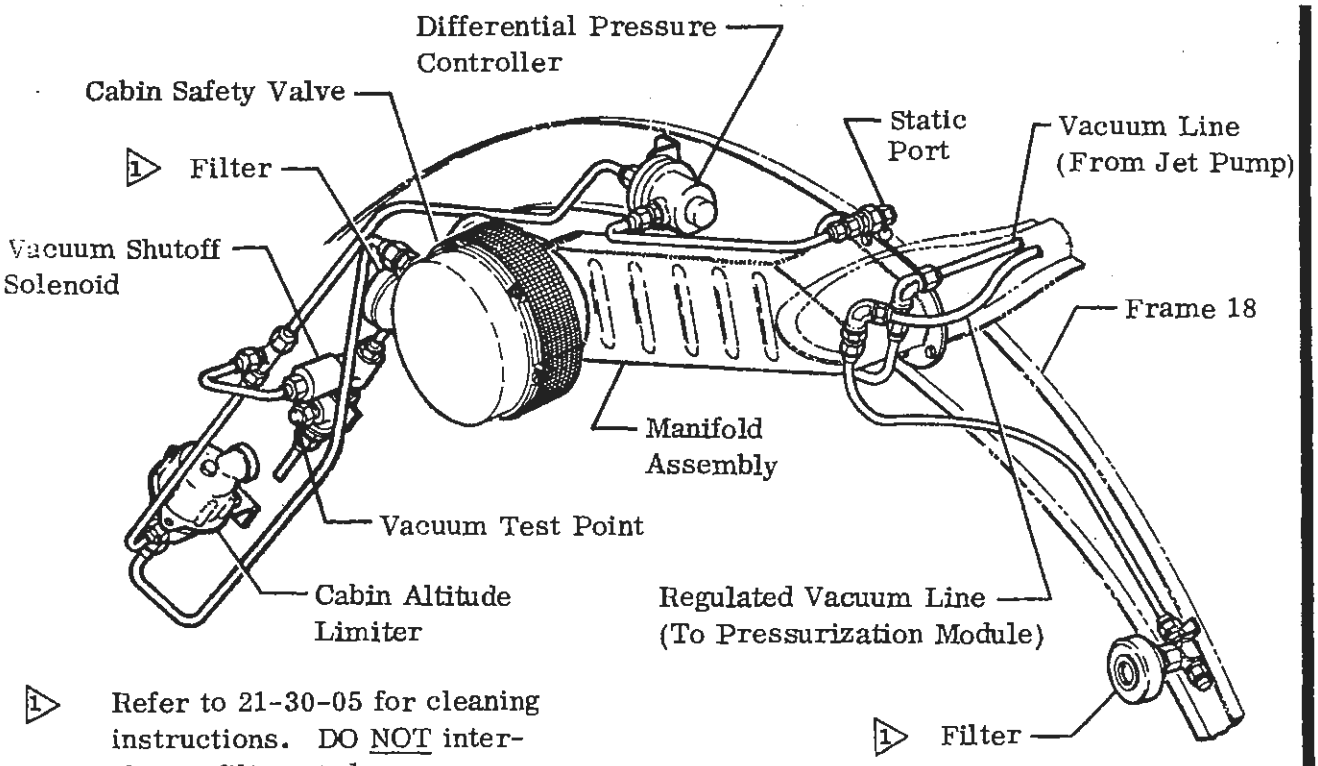
25C Aircraft 25-061, 25-070 thru 25-089, 25-091 thru 25-094 except when Modified per AMK 72-3 (Installation of Cabin Altitude Limiter)



25C/F Aircraft 25-061, 25-070 thru 25-089, 25-091 thru 25-093 when Modified per AMK 72-3 (Installation of Cabin Altitude Limiter) and 25-090, 25-095 thru 25-226

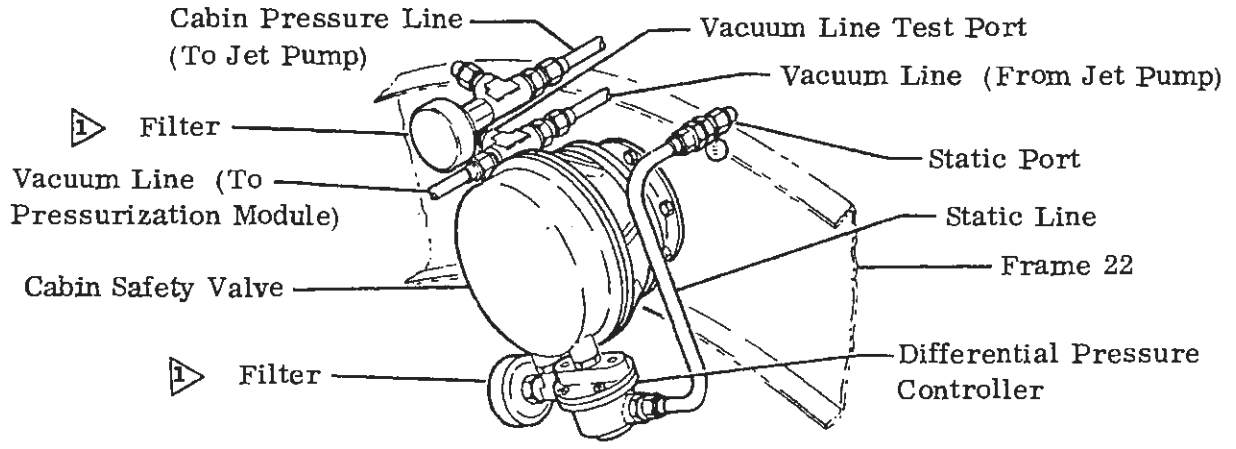
Cabin Safety Valve Installation
Figure 201 (Sheet 1 of 4)

13-67C-2



1 Refer to 21-30-05 for cleaning instructions. DO NOT interchange filter studs.

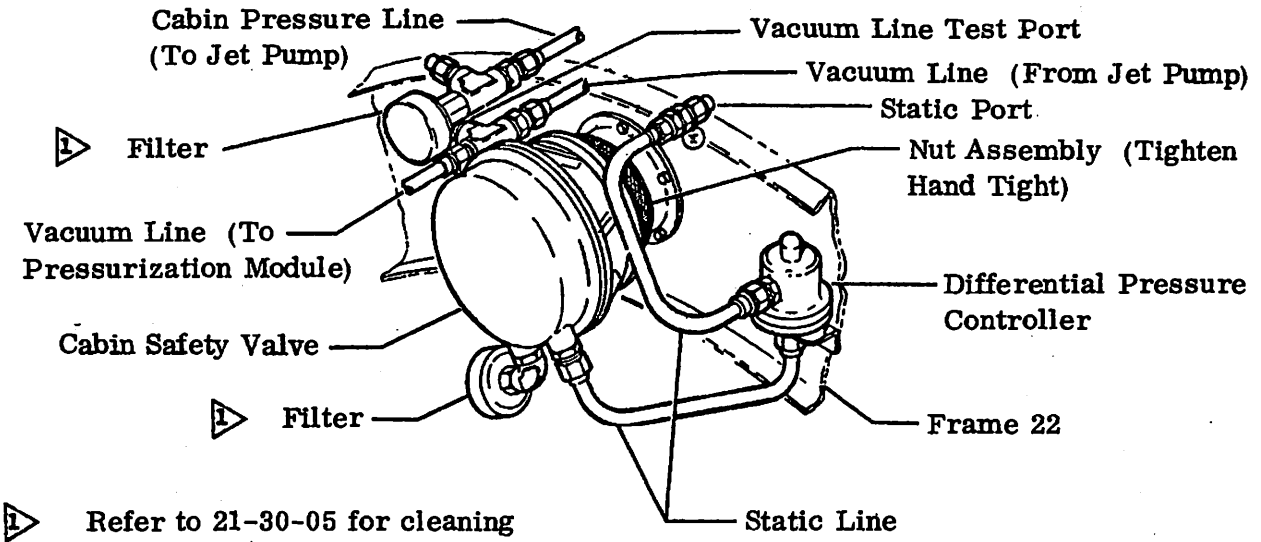
25F Aircraft 25-227 and Subsequent



25B Aircraft 25-070 thru 25-077 except when Modified per AMK 72-3 (Installation of Cabin Altitude Limiter)

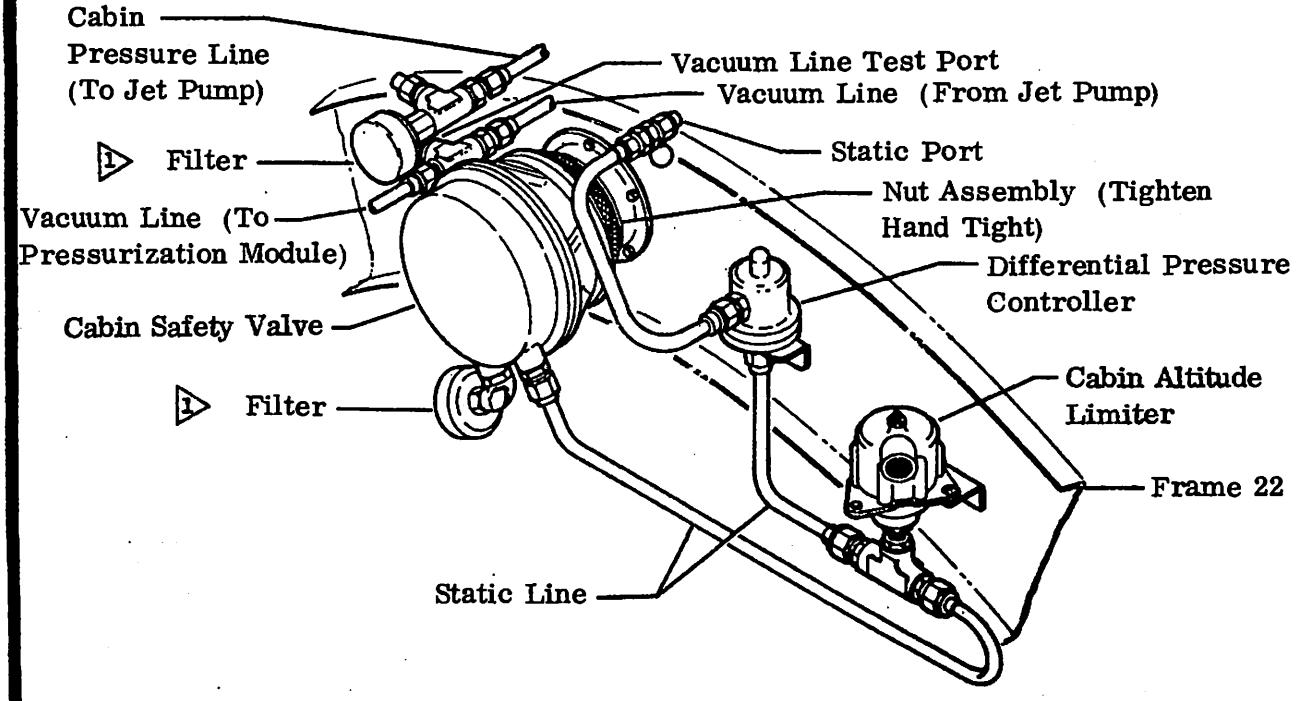
Cabin Safety Valve Installation
Figure 201 (Sheet 2 of 4)

13-64D
13-67C-3



1 Refer to 21-30-05 for cleaning instructions. DO NOT interchange filter studs.

25B Aircraft 25-078 thru 25-089, 25-091 thru 25-093 except when Modified per AMK 72-3 (Installation of Cabin Altitude Limiter)

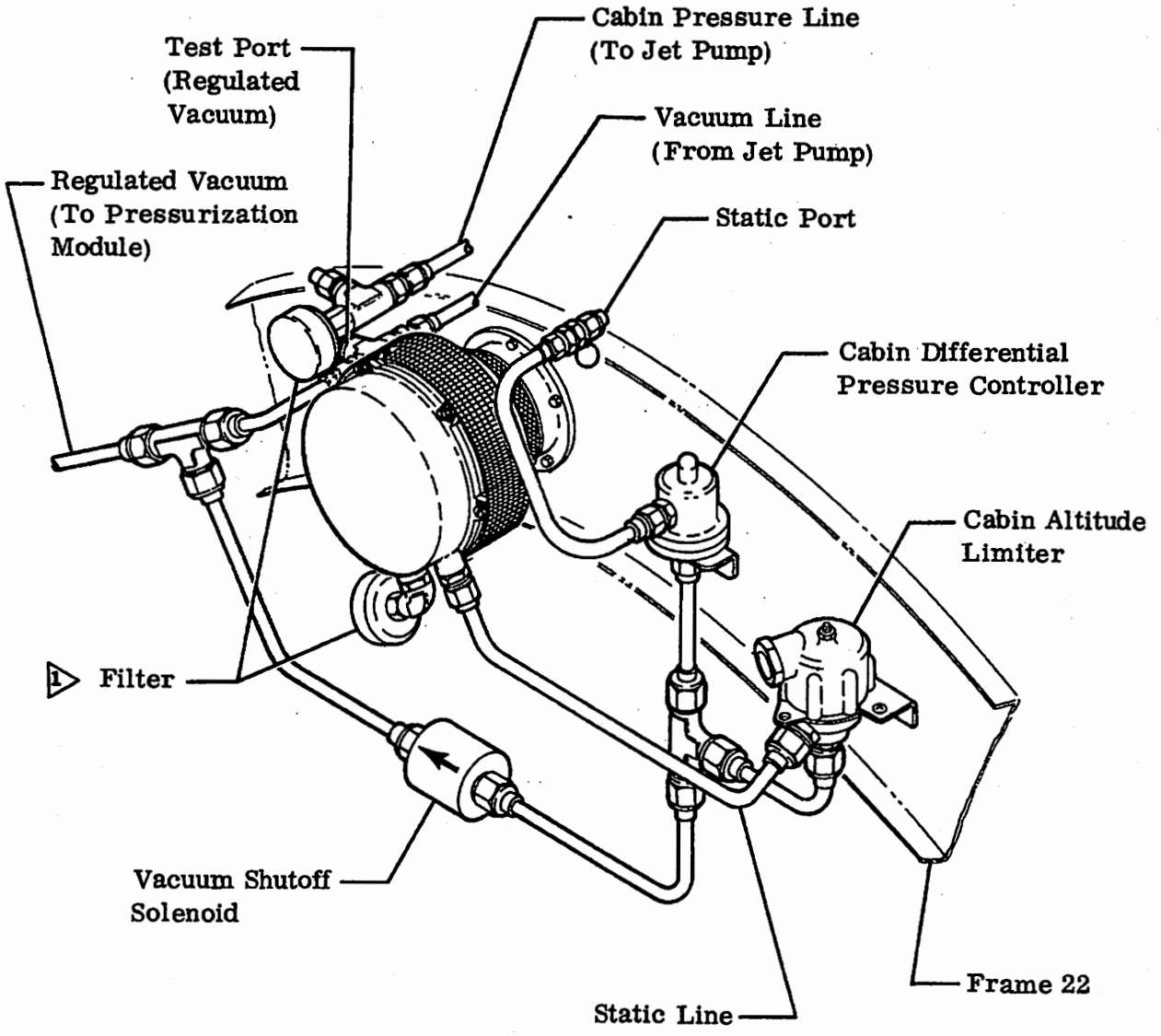


25B/D Aircraft 25-070 thru 25-089, 25-091 thru 25-093 when Modified per AMK 72-3 (Installation of Cabin Altitude Limiter) and 25-090, 25-094 thru 25-226

Cabin Safety Valve Installation
Figure 201 (Sheet 3 of 4)

13-64D-1

1 Refer to 21-30-05 for cleaning instructions. DO NOT interchange filter studs.



Cabin Safety Valve Installation
Figure 201 (Sheet 4 of 4)

13-67B-1

2. Adjustment/Test

A. Cabin Safety Valve Functional Test (Aircraft 25-061, 25-070 and Subsequent)

(1) Remove air filter from cabin safety valve and plug port. (See figure 201.)

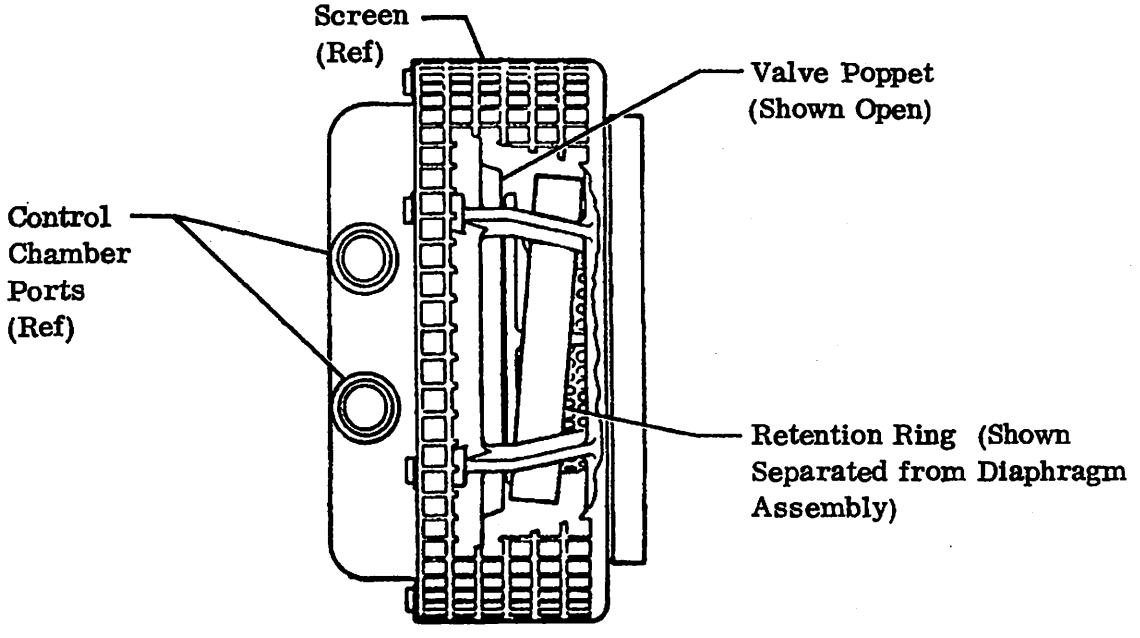
(2) Disconnect static line from cabin safety valve.

(3) Connect a source of eight inches of water vacuum to cabin safety valve static port.

(4) Using a flashlight and inspection mirror, visually check that safety valve poppet has opened. At the same time, check that diaphragm retention ring has not separated from poppet assembly. (See figure 202.)

(5) If cabin safety valve failed to open or diaphragm retention ring has separated from poppet assembly, replace cabin safety valve.

(6) Disconnect vacuum source and restore system to normal.



WARNING: DEFECTIVE VALVE ASSEMBLY SHOWN. DO NOT INSTALL VALVE ASSEMBLY IN THIS CONDITION.

Cabin Safety Valve Inspection
Figure 202

3. Cleaning/Painting

A. Clean Cabin Safety Valve (See figure 203.)

WARNING: DO NOT USE MEK OR OTHER HYDROCARBONS BASE SOLVENTS ON COMPONENTS OR SURFACES MADE OF PLASTIC.

CAUTION: DO NOT DISASSEMBLE CABIN SAFETY VALVE ASSEMBLY FOR CLEANING AS THIS WILL VOID ANY WARRANTY AND MAY HAMPER THE INTEGRITY OF THE VALVE ASSEMBLY.

NOTE: Remove and clean cabin safety valve in accordance with the inspection interval specified in Chapter 5.

(1) Remove cabin safety valve. (Refer to Removal/Installation and perform steps 1.A.(1) thru 1.A.(4).)

CAUTION:
- HEAVILY CONTAMINATED VALVES MUST BE SOAKED IN CLEANING AGENT FOR A PERIOD OF TIME TO REMOVE EXCESS CONTAMINANTS PRIOR TO COMPLETION OF CLEANING PROCEDURES.
- DO NOT ALLOW CLEANING AGENT TO ENTER THROUGH CABIN PRESSURE INLET HOLES IN VALVE POPPET ASSEMBLY.

(2) Place valve in pan of isopropyl alcohol or a mild detergent and water to soak. For initial soaking, the valve poppet will be closed instead of open as shown in figure 203.

(3) After removing excess contaminants and using a No. 30 (1/8 inch) drill bit, insert blunt end of drill bit into shank end of valve center core port and push valve poppet to open position (approximately one inch). Cap the valve fitting to retain vacuum in control chamber. This will hold the valve open when the drill bit is removed.

CAUTION: VALVE MUST BE MONITORED TO ASSURE THAT VALVE POPPET DOES NOT SLOWLY CLOSE WHILE SETTING IN CLEANING AGENT. ANY SMALL LEAKAGE, EITHER FROM CAPPED VALVE FITTINGS OR INTERNAL LEAKAGE, WILL ALLOW THE VALVE POPPET TO SLOWLY CLOSE AND ALLOW CLEANING AGENT TO ENTER THE CABIN PRESSURE INLET HOLES.

(4) Place valve in a pan of isopropyl alcohol or a mild detergent and water as shown in figure 203. Monitor valve poppet assuring that it stays open.

CAUTION:
- CLEANING AGENT LEVEL SHOULD NOT BE ABOVE LEVEL AS ILLUSTRATED WHEN VALVE ASSEMBLY IS IMMERSERED.
- DO NOT ALLOW CLEANING AGENT TO ENTER THROUGH CABIN PRESSURE INLET HOLES IN VALVE POPPET ASSEMBLY.

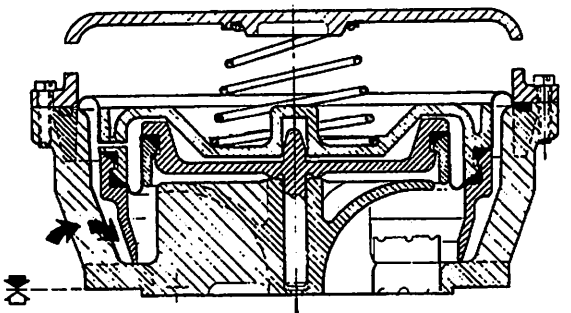
(5) Soak valve in cleaning agent enough to loosen or remove contaminants.

NOTE: A cotton swab or acid brush may be used to scrub the noise suppression screen, poppet, and etc. if required. Pay particular attention to valve poppet assembly and valve poppet seating areas.

(6) Perform a visual inspection of cabin safety valve to ensure that diaphragm retention ring has not separated from valve poppet assembly (see figure 203), and that poppet assembly is seating properly. Replace cabin safety valve if necessary.

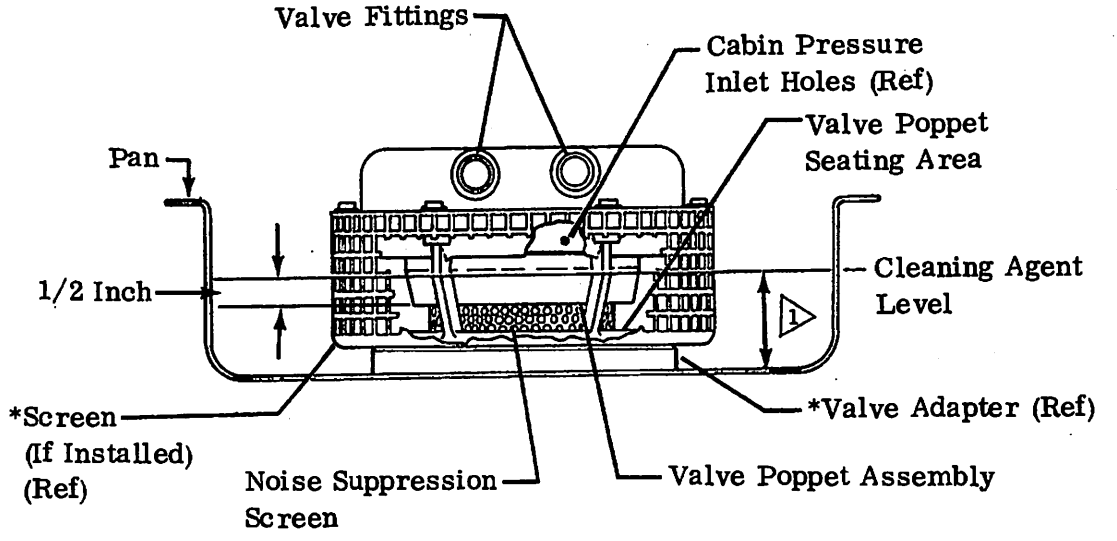
(7) Install cabin safety valve.

* Valve screen (if installed) and valve adapter shall not be removed from valve assembly.



Insert blunt end of drill bit at this point.

1 Cleaning agent level will vary due to the type of valve adapter installed. Cleaning agent level must be adjusted so that the valve poppet assembly is immersed at least 1/2 inch in cleaning agent. Cleaning agent must not enter the cabin pressure inlet holes.



Valve Shown Partially Open

Cabin Safety Valve Cleaning
Figure 203

CABIN DIFFERENTIAL PRESSURE CONTROLLER - MAINTENANCE PRACTICES

1. Removal/Installation

WARNING: ALL MAINTENANCE WORK SHOULD BE DONE IN A CLEAN ENVIRONMENT TO HELP MAINTAIN THE INTEGRITY OF THE SYSTEM. WHEN ANY TUBE OR HOSE ASSEMBLY IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ASSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED AND IDENTIFIED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE A SYSTEM MALFUNCTION.

CAUTION: ALL FITTINGS THAT MATE TO PLASTIC COMPONENTS SHALL BE TORQUED 15 (±5) INCH-POUNDS. WHEN ATTACHING A TUBE OR HOSE ASSEMBLY TO AN ADAPTER FITTING LOCATED IN A PLASTIC COMPONENT, HOLD ADAPTER FIRMLY IN PLACE WITH WRENCH BEFORE APPLYING APPROPRIATE TORQUE TO TUBE OR HOSE ASSEMBLY FITTING. (Refer to Chapter 20.)

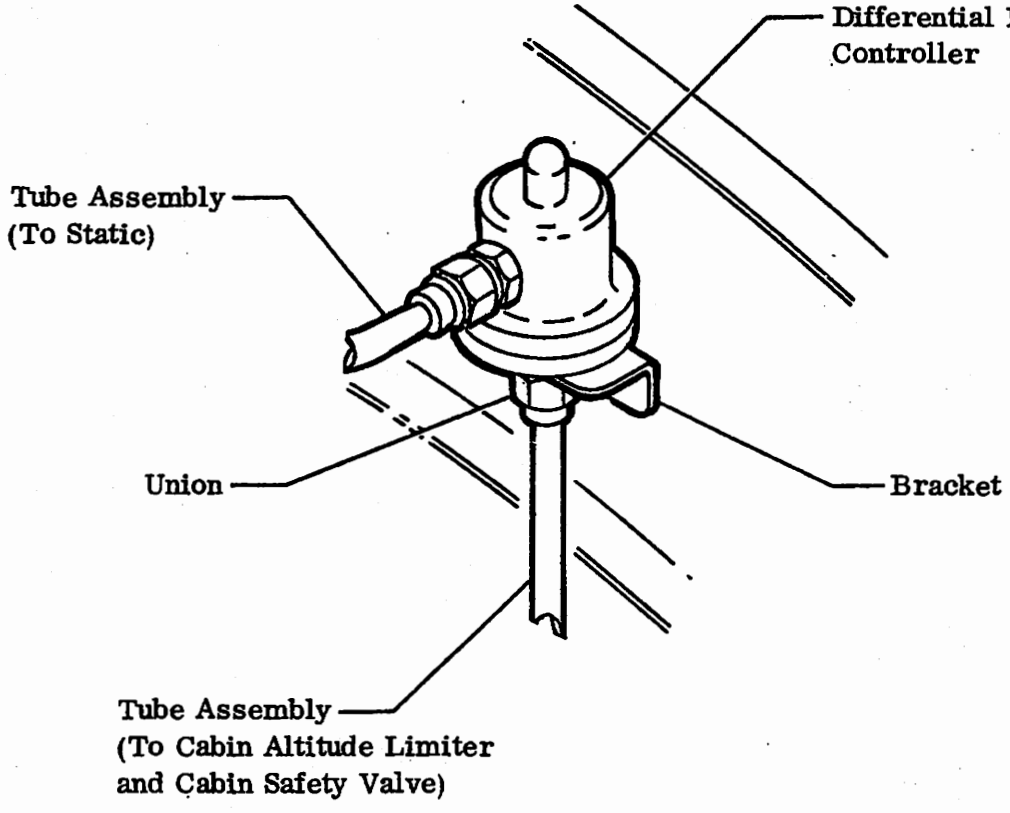
A. Remove Cabin Air Exhaust Control Valve Differential Pressure Controller. (See figure 201.)
   (1) Remove attaching parts and lower pressurization module to gain access to differential pressure controller.
   (2) Disconnect lines from controller and cap all exposed openings.
   (3) Remove attaching parts and controller from module.

B. Install Cabin Air Exhaust Control Valve Differential Pressure Controller. (See figure 201.)
   (1) Install controller and secure with attaching parts.
   (2) Remove caps and connect lines to controller.
   (3) Visually inspect installation to ensure components are installed properly.
   (4) Secure pressurization module with attaching parts and perform operational check of pressurization system. (Refer to 21-30-00.)

C. Remove Cabin Safety Valve Differential Pressure Controller. (See figure 202.)
   (1) Remove baggage compartment headliner.
   (2) Disconnect static lines from controller and cap all exposed openings.
   (3) Loosen union and remove controller from aircraft.

NOTE

Refer to 21-30-01 for differential pressure controller installation in pressurization module.



TYPICAL INSTALLATION

Cabin Safety Valve Differential Pressure Controller Shown

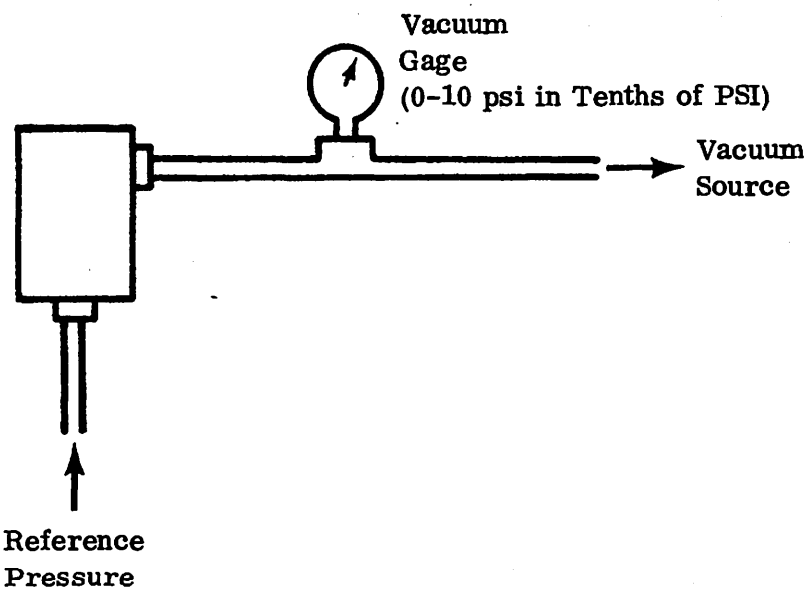
Cabin Differential Pressure Controller Installation
Figure 201

D. Install Cabin Safety Valve Differential Pressure Controller. (See figure 201.)
(1) Install controller and secure with union. Torque union 15 (±5) inch-pounds.
(2) Remove caps and connect static lines to controller.
(3) Visually inspect installation to ensure components are installed properly.
(4) Perform operational check of pressurization system. (Refer to 21-30-00.)
(5) Install baggage compartment headliner.

2. Adjustment/Test
A. Functional Test of Cabin Safety Valve Differential Pressure Controller. (See figure 202.)
(1) Remove cabin safety valve differential pressure controller.
(2) Connect test equipment to controller as shown in figure 202.

CAUTION: APPLY VACUUM TO CONTROLLER SLOWLY.

(3) Slowly apply vacuum to controller until vacuum gage pointer stops moving. Vacuum gage pointer shall stop moving and stabilize as follows:
(a) Aircraft 25-061, 25-070 thru 25-226, shall be at 9.2 (±0.15) psi.
(b) Aircraft 25-227 and Subsequent, shall be at 9.7 (±0.15) psi.
(4) If controller fails to maintain the calibrated value, it is defective and must be replaced.
(5) Disconnect test equipment and install controller.



Cabin Safety Valve Differential Pressure Controller Functional Test
Figure 202

CABIN AIR FILTER - MAINTENANCE PRACTICES

WARNING: ALL MAINTENANCE WORK SHOULD BE DONE IN A CLEAN ENVIRONMENT TO HELP MAINTAIN THE INTEGRITY OF THE SYSTEM. WHEN ANY TUBE OR HOSE ASSEMBLY IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ASSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED AND IDENTIFIED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE A SYSTEM MALFUNCTION.

1. Removal/Installation

WARNING: THE CABIN AIR FILTERS ARE NOT INTERCHANGEABLE DUE TO THE ORIFICE IN THE FILTER STUD ASSEMBLIES.

A. Disassemble Foam-Type Filter Assembly (See figure 201.)
   (1) Remove equipment as necessary to gain access to filter installation.
   (2) Remove snap ring, retainer, top cap, spring, base cap, and filter element from filter stud.
   (3) Clean and/or replace filter element.

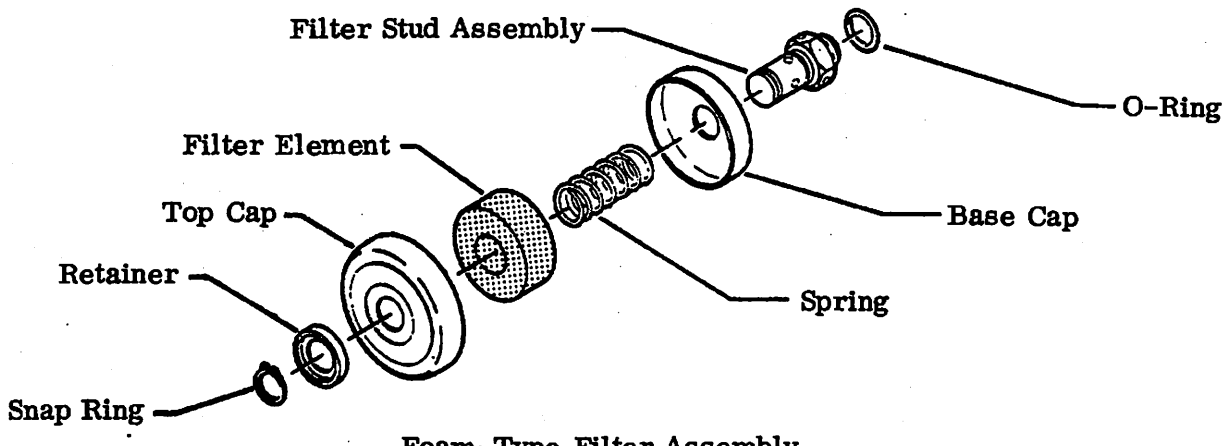
B. Assemble Foam-Type Filter Assembly (See figure 201.)
   (1) Install base cap, spring, filter element, top cap, retainer, and snap ring on filter stud.
   (2) Install previously removed equipment.
   (3) Visually inspect installation to ensure components are installed properly.

2. Cleaning/Painting

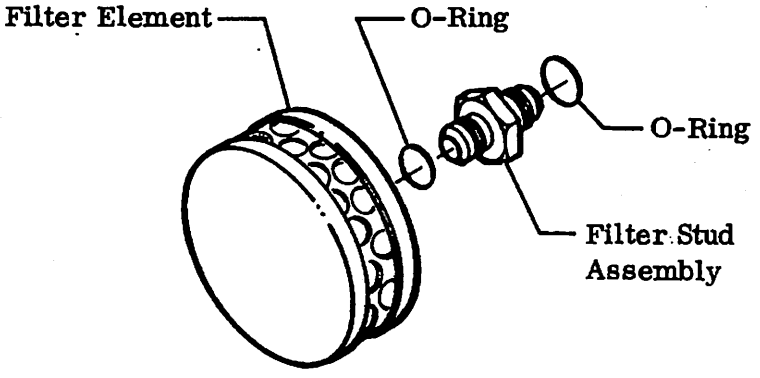
WARNING: DO NOT USE MEK OR OTHER HYDROCARBON BASE SOLVENTS ON COMPONENTS OR SURFACES MADE OF PLASTIC.

NOTE:
- The cabin air filter assemblies must be cleaned or replaced at the time intervals specified in Chapter 5.
- On aircraft equipped with the cleanable foam-type air filter assembly, maintenance practices consist of disassembly, cleaning filter element, and reassembly.

A. Clean Foam-Type Filter Element
   (1) Remove filter element.
   (2) Wash filter element with isopropyl alcohol or with water and mild detergent.
   (3) Install filter element.



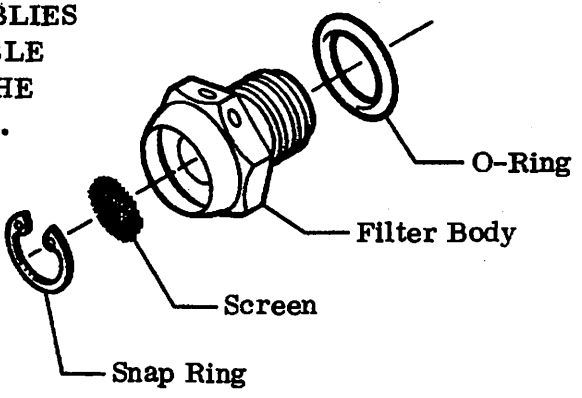
Foam-Type Filter Assembly



Paper-Type Filter Assembly

WARNING

CABIN AIR FILTER ASSEMBLIES ARE NOT INTERCHANGEABLE DUE TO THE ORIFICE IN THE FILTER STUD ASSEMBLIES.



Nut-Type Filter Assembly

Cabin Air Filter Assemblies
Figure 201

13-64D
13-158A
13-123A

CABIN ALTITUDE LIMITER - MAINTENANCE PRACTICES

1. Removal/Installation

WARNING: ALL MAINTENANCE WORK SHOULD BE DONE IN A CLEAN ENVIRONMENT TO HELP MAINTAIN THE INTEGRITY OF THE SYSTEM. WHEN ANY TUBE OR HOSE ASSEMBLY IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ASSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED AND IDENTIFIED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE A SYSTEM MALFUNCTION.

CAUTION: ALL FITTINGS THAT MATE TO PLASTIC COMPONENTS SHALL BE TORQUED 15 (±5) INCH-POUNDS. WHEN ATTACHING A TUBE OR HOSE ASSEMBLY TO AN ADAPTER FITTING LOCATED IN A PLASTIC COMPONENT, HOLD ADAPTER FIRMLY IN PLACE WITH WRENCH BEFORE APPLYING APPROPRIATE TORQUE TO TUBE OR HOSE ASSEMBLY FITTING. (Refer to Chapter 20.)

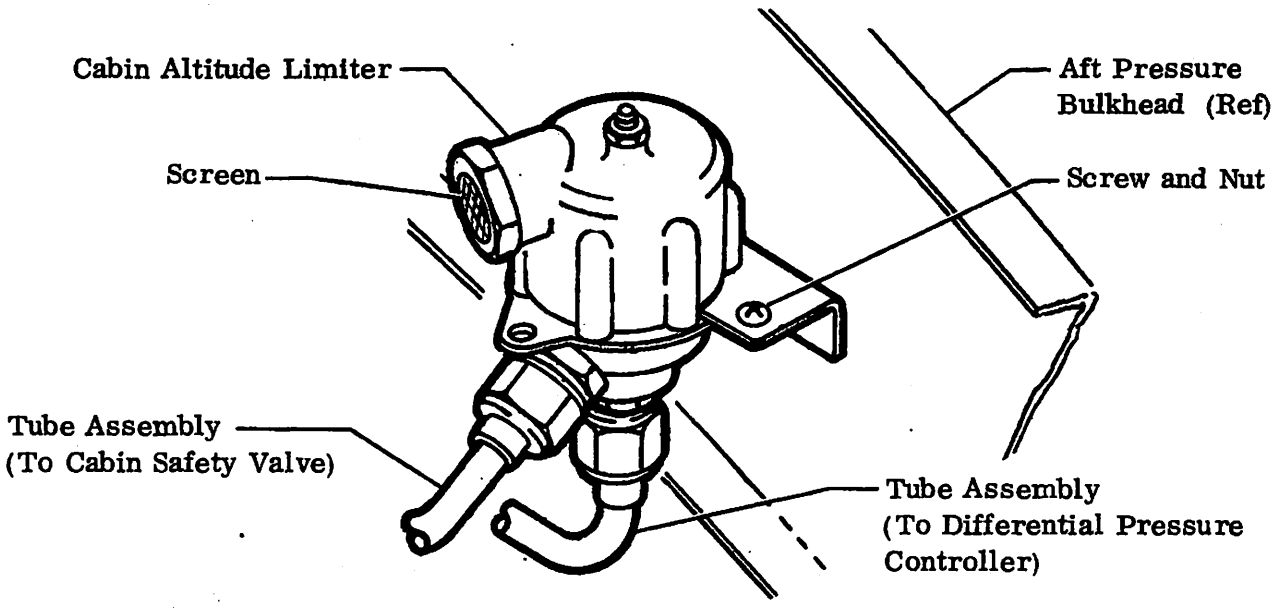
A. Remove Aft Cabin Altitude Limiter (See figure 201.)
   (1) Remove baggage compartment headliner.
   (2) Disconnect static lines from cabin altitude limiter fittings. Cap all exposed openings.
   (3) Remove attaching parts and altitude limiter from aircraft.
   (4) Check screen; remove and clean if required.

B. Install Aft Cabin Altitude Limiter (See figure 201.)
   (1) Install altitude limiter and secure with attaching parts.
   (2) Remove caps and connect static lines to cabin altitude limiter fittings.
   (3) Visually inspect installation to ensure components are installed properly.
   (4) Install baggage compartment headliner.

2. Cleaning/Painting

WARNING: DO NOT USE MEK OR OTHER HYDROCARBON BASE SOLVENTS ON COMPONENTS OR SURFACES MADE OF PLASTIC.

A. Remove and Clean Cabin Altitude Limiter Screen
   (1) Remove snap ring and screen from limiter.
   (2) Inspect screen for damage. Replace if necessary.
   (3) Clean screen with MEK or equivalent and air dry.
   (4) Install screen and secure with snap ring.

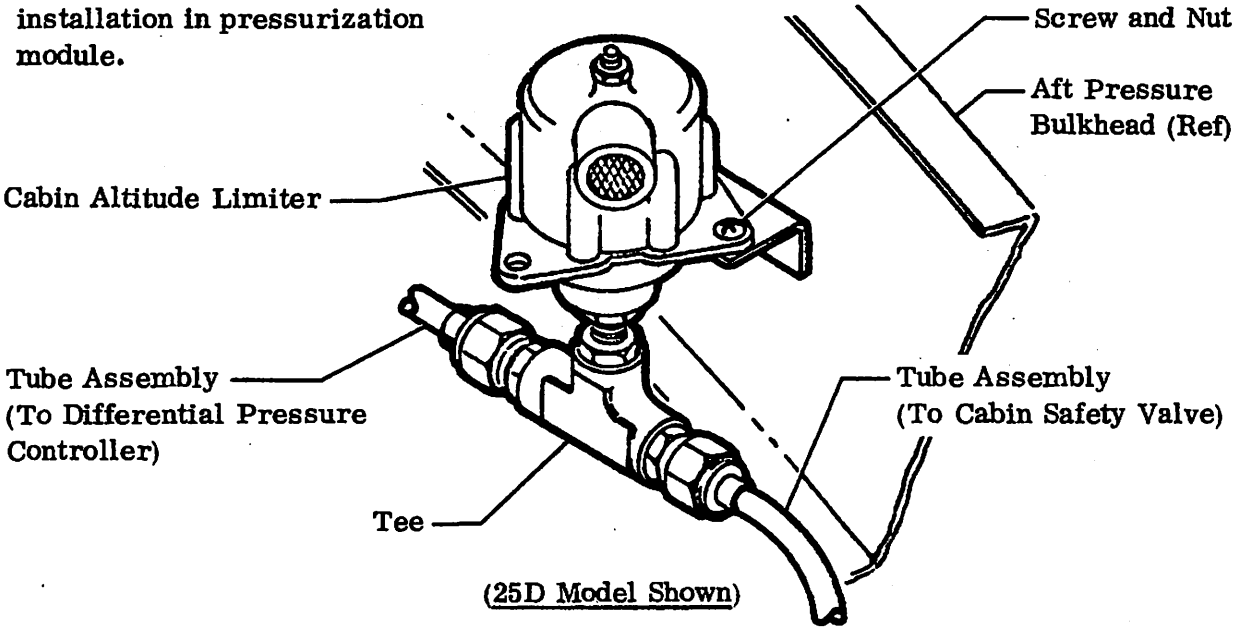


(25D Model Shown)

Aircraft 25-227 and Subsequent

NOTE

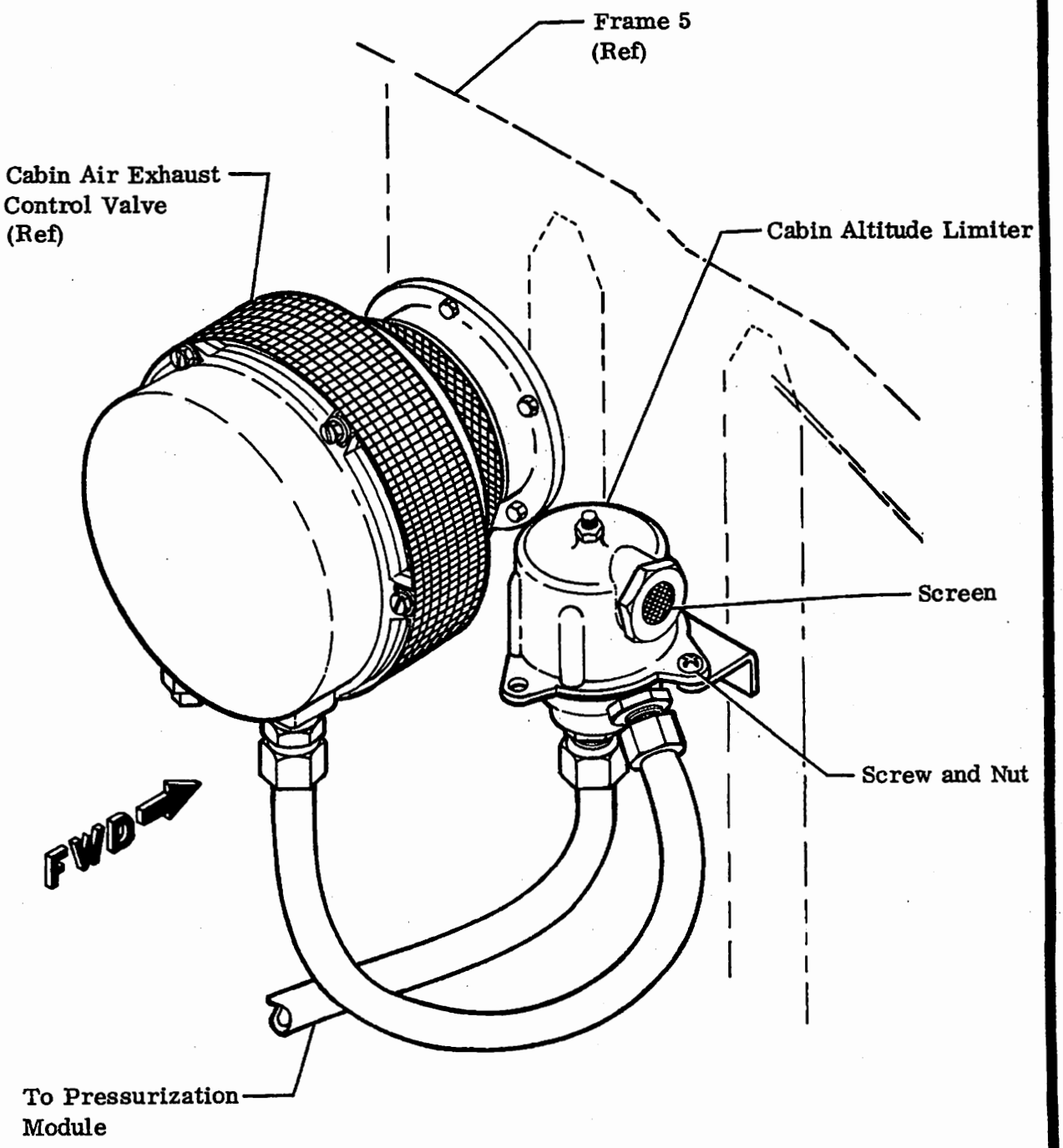
Refer to 21-30-01 for cabin altitude limiter installation in pressurization module.



(25D Model Shown)

TYPICAL AFT INSTALLATION

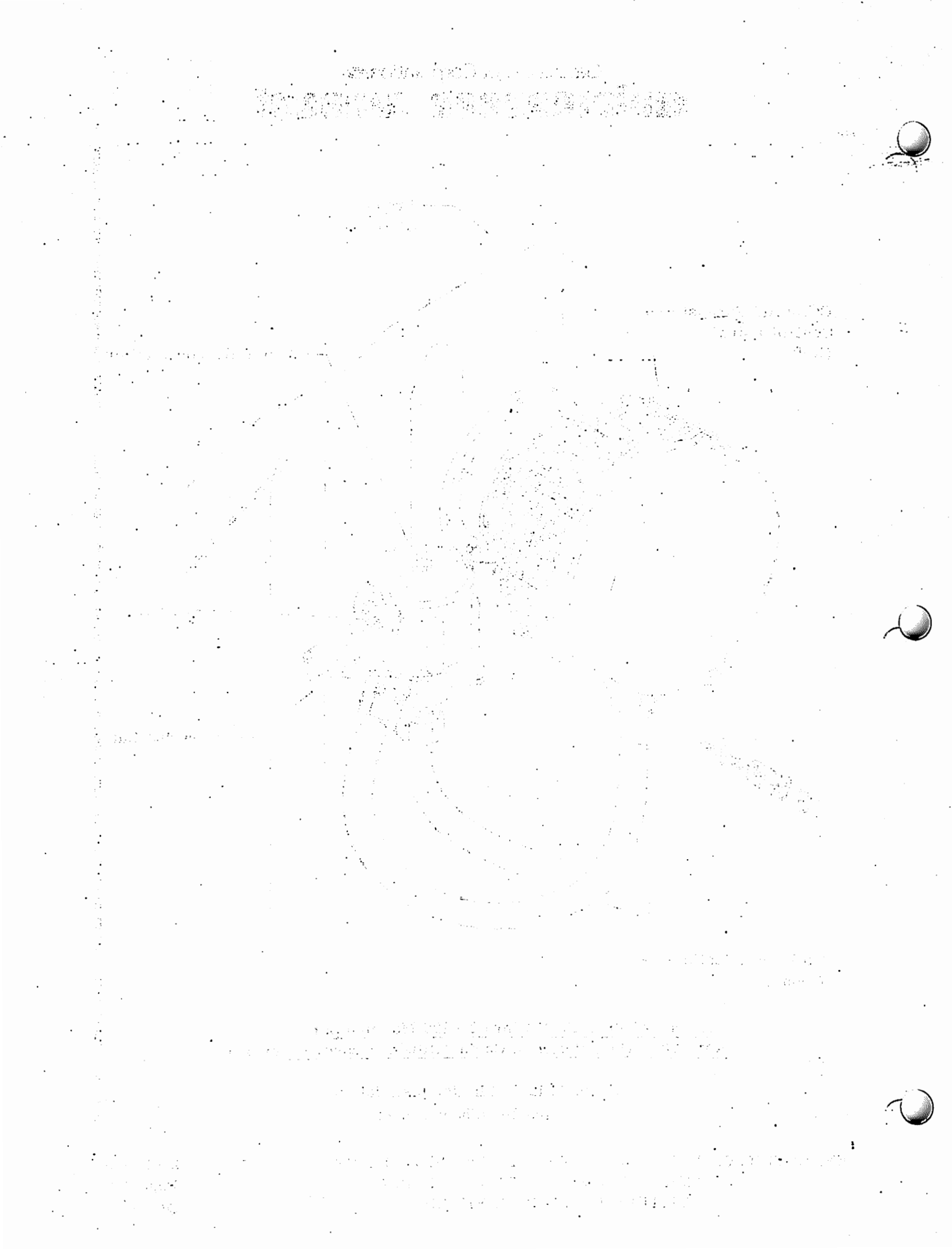
Cabin Altitude Limiter Installation
Figure 201 (Sheet 1 of 2)



Aircraft 25-061, 25-070 thru 25-226 Modified per
AMK 78-5 (Installation of Cabin Altitude Pressure Limiter)

Cabin Altitude Limiter Installation
Figure 201 (Sheet 2 of 2)

13-158B



PRESSURIZATION ANEROID SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Cabin Air Exhaust Control Valve Aneroid Switch (See figure 201.)
   (1) Lower copilot's instrument panel.
   (2) Disconnect electrical wiring from aneroid switch.
   (3) Remove attaching parts and aneroid switch from pressurization module.

B. Install Cabin Air Exhaust Control Valve Aneroid Switch (See figure 201.)
   (1) Install aneroid switch and secure with attaching parts.
   (2) Connect electrical wiring to aneroid switch.
   (3) Visually inspect installation to ensure components are installed properly.
   (4) Raise and secure copilot's instrument panel.

C. Remove Emergency Pressurization Aneroid Switch (Aircraft 25-227 and Subsequent) (See figure 201.)
   (1) Remove upholstery or upper center panel as required to gain access to aneroid switch installation.
   (2) Disconnect electrical connector from aneroid switch.
   (3) Remove attaching parts and aneroid switch from aircraft.

D. Install Emergency Pressurization Aneroid Switch (Aircraft 25-227 and Subsequent) (See figure 201.)
   (1) Install aneroid switch and secure with attaching parts.
   (2) Connect electrical connector to switch.
   (3) Visually inspect installation to ensure components are installed properly.
   (4) Install previously removed upholstery and/or upper center panel.

2. Adjustment/Test

NOTE: Before performing any of the following functional tests, set test altimeter to 29.92 inches of mercury.

A. Functional Test of Cabin Air Exhaust Control Valve Aneroid Switches (Aircraft 25-061, 25-070 thru 25-226) (See figure 202.)
   (1) Remove aneroid switch from module.
   (2) Place aneroid switch in test set vacuum chamber as shown in figure 202.
   (3) Connect ohmmeter to wires C and N.O. Assure that continuity exists.
   (4) Slowly apply vacuum while observing ohmmeter and altimeter; switch shall actuate at 10,000 (±500) feet.
   (5) Slowly release vacuum while observing ohmmeter and altimeter; switch shall reset on or before 7500 feet minimum.
   (6) Remove aneroid switch from test set.
   (7) Install switch and secure with attaching parts.

B. Functional Test of Cabin Air Exhaust Control Valve Aneroid Switch (Aircraft 25-227 and Subsequent) (See figure 202.)

(1) Pull CABIN PRESS circuit breaker.
(2) Remove filter from aneroid switch.
(3) Install 90° elbow on aneroid switch.
(4) Connect hose between vacuum source (pitot-static tester or equivalent), altimeter, and pressurization module as shown in figure 202.
(5) Connect ohmmeter across pins J and N of module connector. Circuit shall be open.

CAUTION: TO AVOID DAMAGE TO TEST GAGE AND/OR ANEROID SWITCH, DO NOT EXCEED 2000 FEET PER MINUTE OR MAKE SUDDEN OR EXCESSIVE PRESSURE CHANGES ASCENDING OR DESCENDING WHEN FUNCTIONALLY TESTING THESE UNITS.

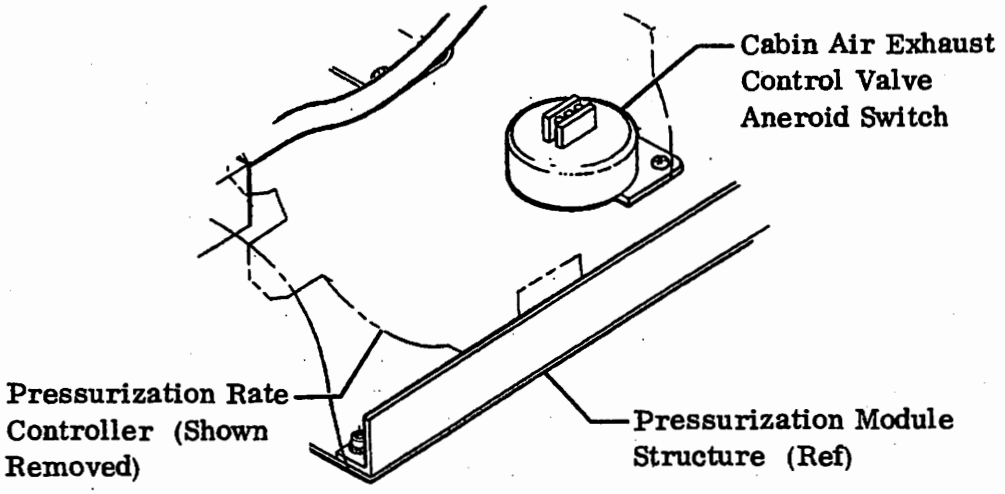
(6) Slowly apply vacuum while observing ohmmeter and altimeter; switch shall actuate (closed circuit) at 8750 (±250) feet.
(7) Slowly release vacuum while observing ohmmeter and altimeter; switch shall reset (open circuit) on or before 7200 feet minimum.
(8) Disconnect hose from test setup.
(9) Remove 90° elbow from aneroid switch.
(10) Install new filter in aneroid switch.
(11) Restore system to normal.

C. Functional Test of Emergency Pressurization Aneroid Switches (Aircraft 25-227 and Subsequent) (See figure 202.)

(1) Connect aneroid switch to test set (pitot-static or equivalent) and to altimeter as shown in figure 202.
(2) Connect ohmmeter across pins A and C. Assure that continuity exists.

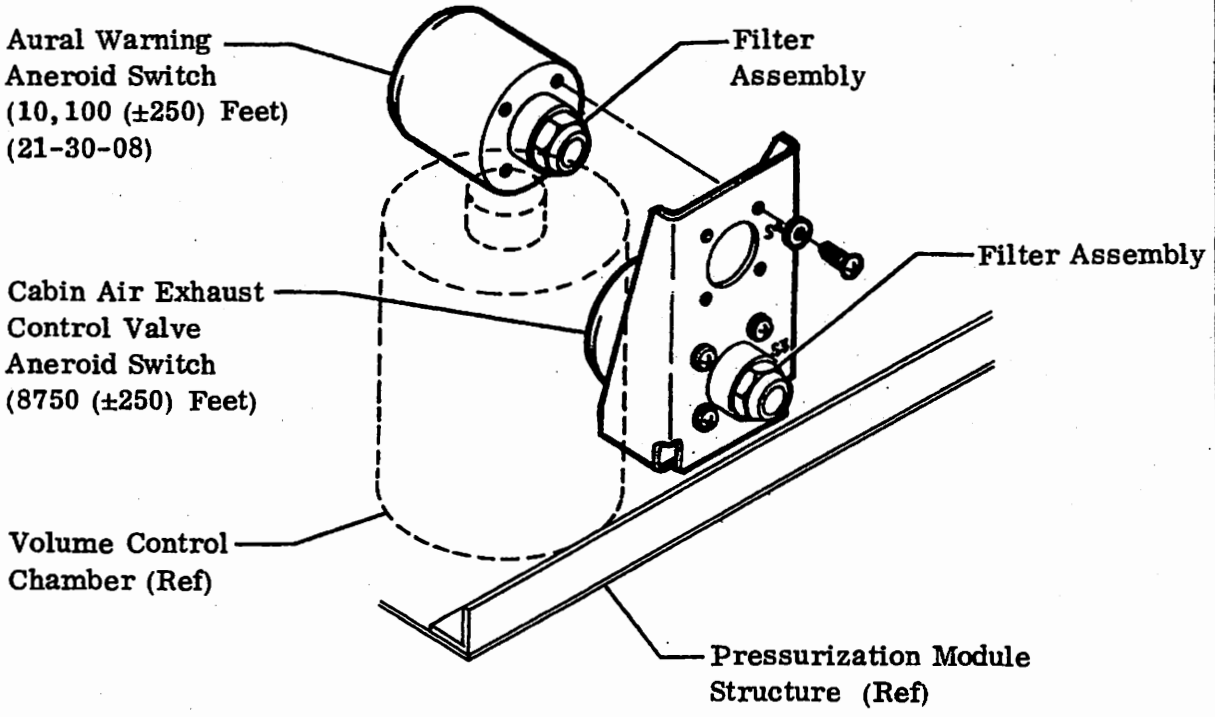
CAUTION: TO AVOID DAMAGE TO TEST GAGE AND/OR ANEROID SWITCH, DO NOT EXCEED 2000 FEET PER MINUTE OR MAKE SUDDEN OR EXCESSIVE PRESSURE CHANGES ASCENDING OR DESCENDING WHEN FUNCTIONALLY TESTING THESE UNITS.

(3) Slowly apply vacuum while observing ohmmeter and altimeter; switch shall actuate at 9500 (±250) feet.
(4) Slowly release vacuum while observing ohmmeter and altimeter; switch shall actuate at 8300 feet minimum.
(5) Remove test setup from aircraft.



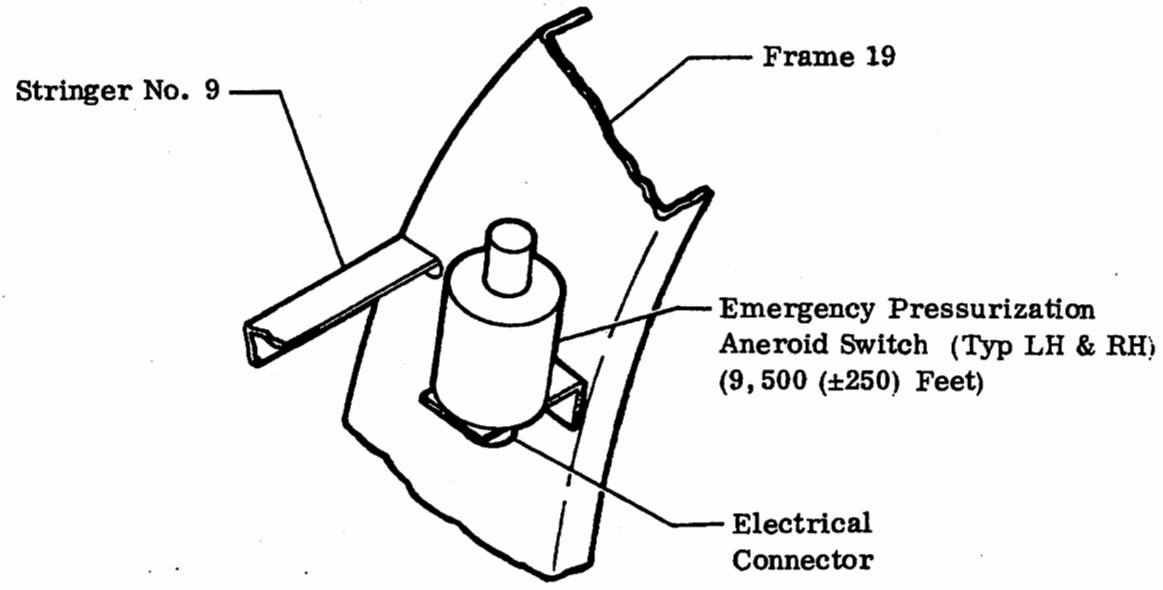
SHOWN WITH COMPONENTS REMOVED

Aircraft 25-061, 25-070 thru 25-226

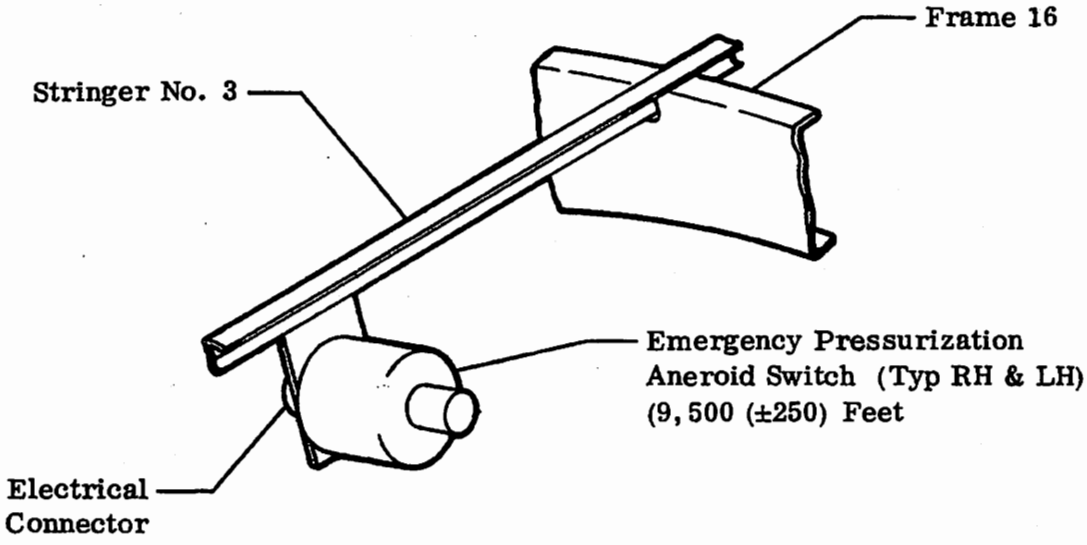


Aircraft 25-227 and Subsequent

Pressurization Aneroid Switch Installation
Figure 201 (Sheet 1 of 2)

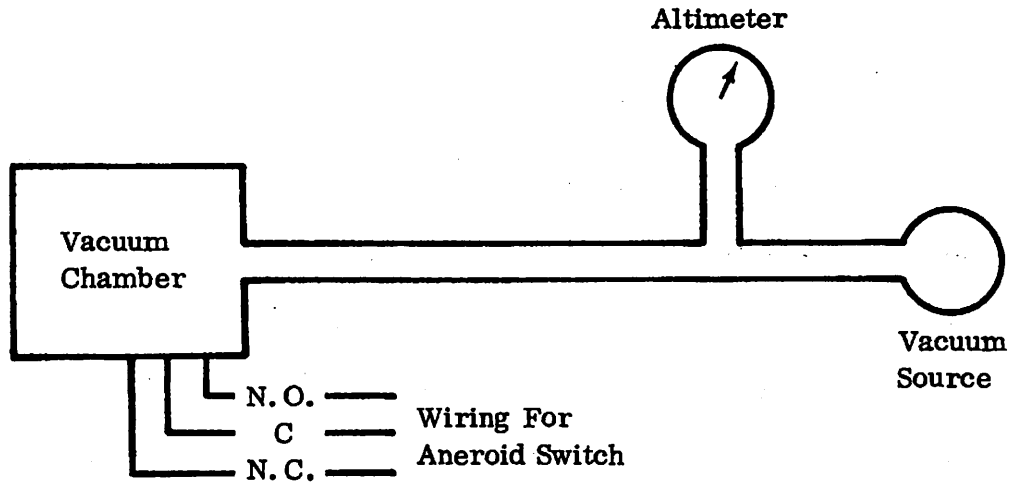


25D Aircraft

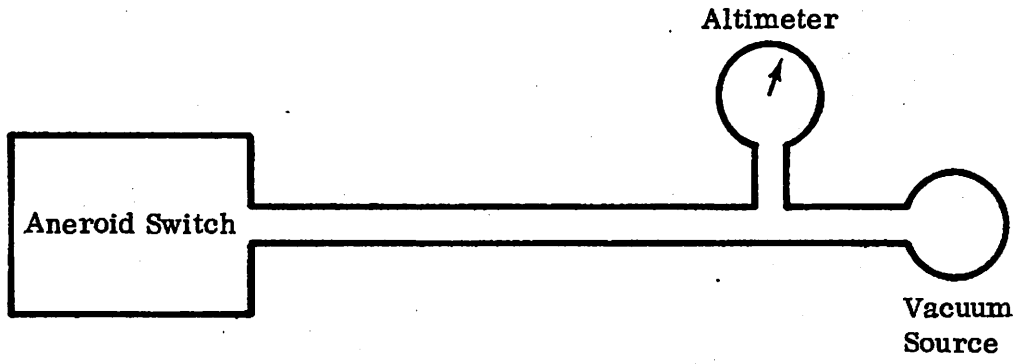


25F Aircraft

Pressurization Aneroid Switch Installation
Figure 201 (Sheet 2 of 2)



Aircraft 25-061, 25-070 thru 25-226



Aircraft 25-227 and Subsequent

Functional Test of Pressurization Aneroid Switches
Figure 202

AURAL WARNING ANEROID SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Aural Warning Aneroid Switch (Aircraft 25-061, 25-070 thru 25-226) (See figure 201.)

(1) Lower copilot's instrument panel to gain access to aural warning aneroid switch.

(2) Disconnect and tag electrical wiring from aneroid switch.

(3) Remove attaching parts and aneroid switch from aircraft.

B. Install Aural Warning Aneroid Switch (Aircraft 25-061, 25-070 thru 25-226) (See figure 201.)

(1) Install aural warning aneroid switch and secure with attaching parts.

(2) Connect electrical wiring to aneroid switch.

(3) Visually inspect installation to ensure components are installed properly.

(4) Raise copilot's instrument panel and secure.

(5) Perform pressurization system operational check. (Refer to 21-30-00.)

C. Remove Aural Warning Aneroid Switch (Aircraft 25-227 and Subsequent) (See figure 201.)

(1) Lower pressurization module to gain access to aural warning aneroid switch.

(2) Disconnect and tag electrical wiring from aneroid switch.

(3) Remove attaching parts and aneroid switch from module.

D. Install Aural Warning Aneroid Switch (Aircraft 25-227 and Subsequent) (See figure 201.)

(1) Install aural warning aneroid switch and secure with attaching parts.

(2) Connect electrical wiring to aneroid switch.

(3) Visually inspect installation to ensure components are installed properly.

(4) Raise pressurization module and secure.

(5) Perform pressurization system operational check. (Refer to 21-30-00.)

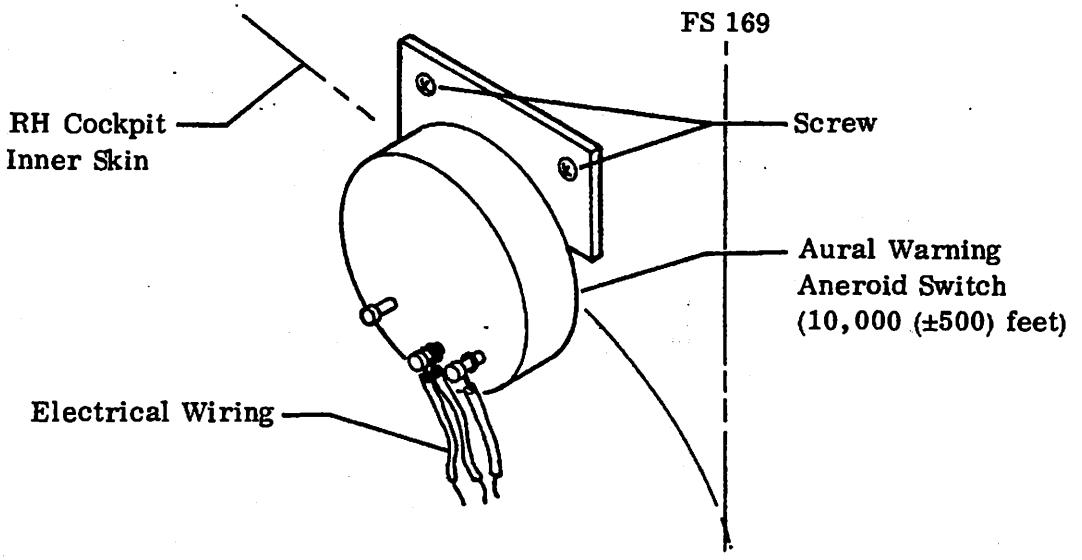
2. Adjustment/Test

NOTE: Before performing any of the following functional tests, set test altimeter to 29.92 inches of mercury.

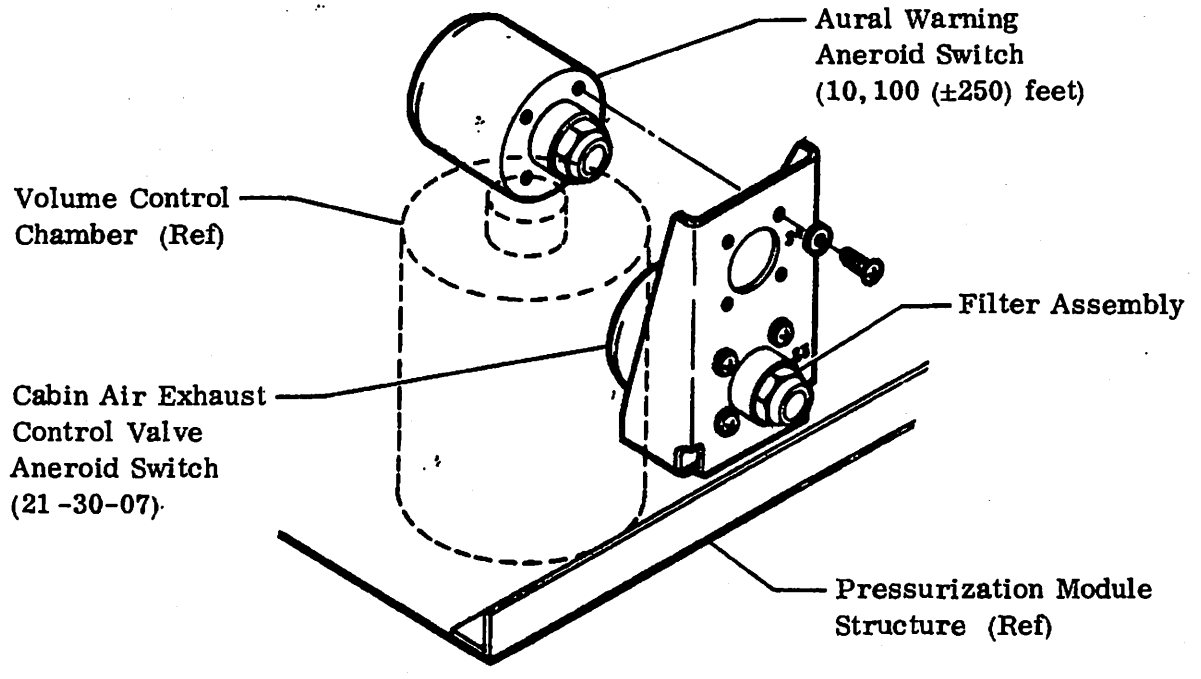
A. Functional Test of Aural Warning Aneroid Switch (Aircraft 25-061, 25-070 thru 25-226) (See figure 202.)

(1) Remove aneroid switch from RH cockpit skin.

(2) Place aneroid switch in test set vacuum chamber as shown in figure 202.



Aircraft 25-061, 25-070 thru 25-226



SHOWN WITH COMPONENTS REMOVED

Aircraft 25-227 and Subsequent

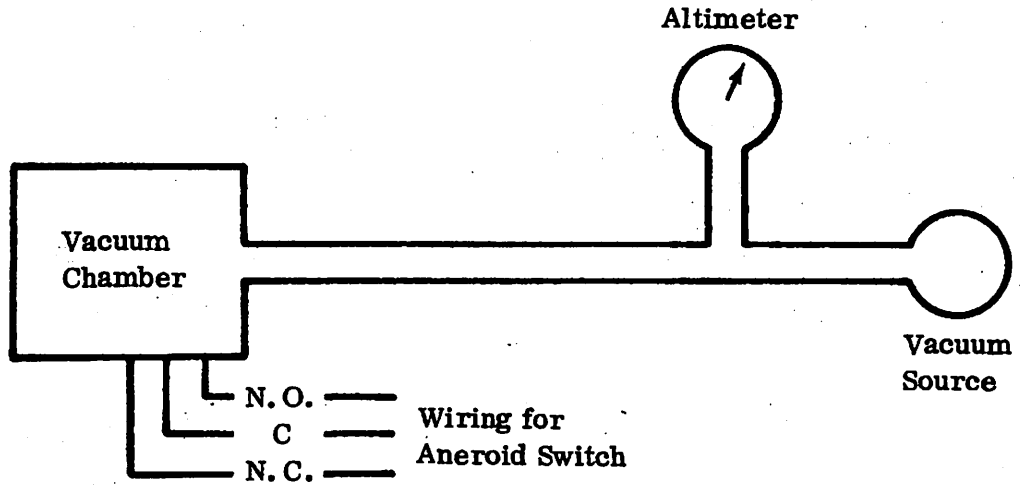
Aneroid Switch Installation
Figure 201

(3) Connect ohmmeter to wires C and N.O. Assure that continuity exists.
(4) Slowly apply vacuum while observing ohmmeter and altimeter; switch shall actuate at 10,000 (±500) feet.
(5) Slowly release vacuum while observing ohmmeter and altimeter; switch shall reset on or before 7500 feet minimum.
(6) Remove aneroid switch from test set.
(7) Install switch and secure with attaching parts.

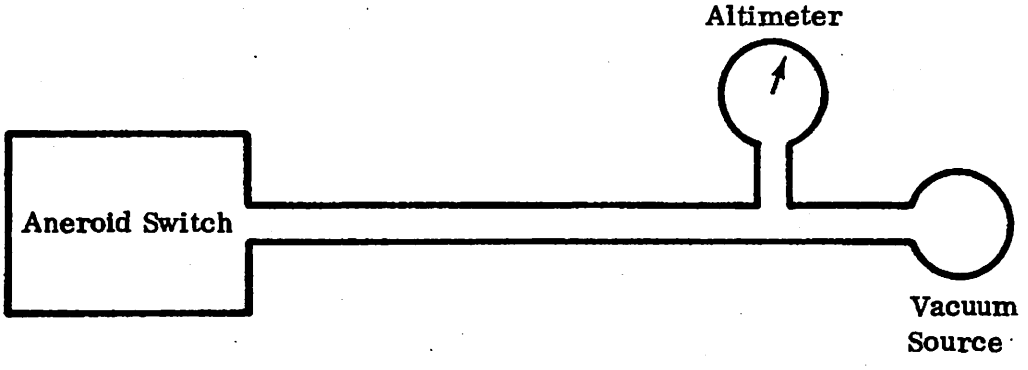
B. Functional Test of Aural Warning Aneroid Switch (Aircraft 25-227 and Subsequent) (See figure 202.)
(1) Connect aneroid switch to test set (pitot-static tester or equivalent) and to altimeter as shown in figure 202.
(2) Connect an ohmmeter across pins M and K. Assure that continuity exists.

CAUTION: TO AVOID DAMAGE TO TEST GAGE AND/OR ANEROID SWITCH, DO NOT EXCEED 2000 FEET PER MINUTE OR MAKE SUDDEN OR EXCESSIVE PRESSURE CHANGES ASCENDING OR DESCENDING WHEN FUNCTIONALLY TESTING THESE UNITS.

(3) Slowly apply vacuum while observing ohmmeter and altimeter; switch shall actuate at 10,100 (±250) feet.
(4) Slowly release vacuum while observing ohmmeter and altimeter, switch shall reset on or before 8600 feet minimum.
(5) Remove test setup from aircraft.



Aircraft 25-067, 25-070 thru 25-226



Aircraft 25-227 and Subsequent

Functional Test of Aural Warning Aneroid Switches
Figure 202

EMERGENCY PRESSURIZATION VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

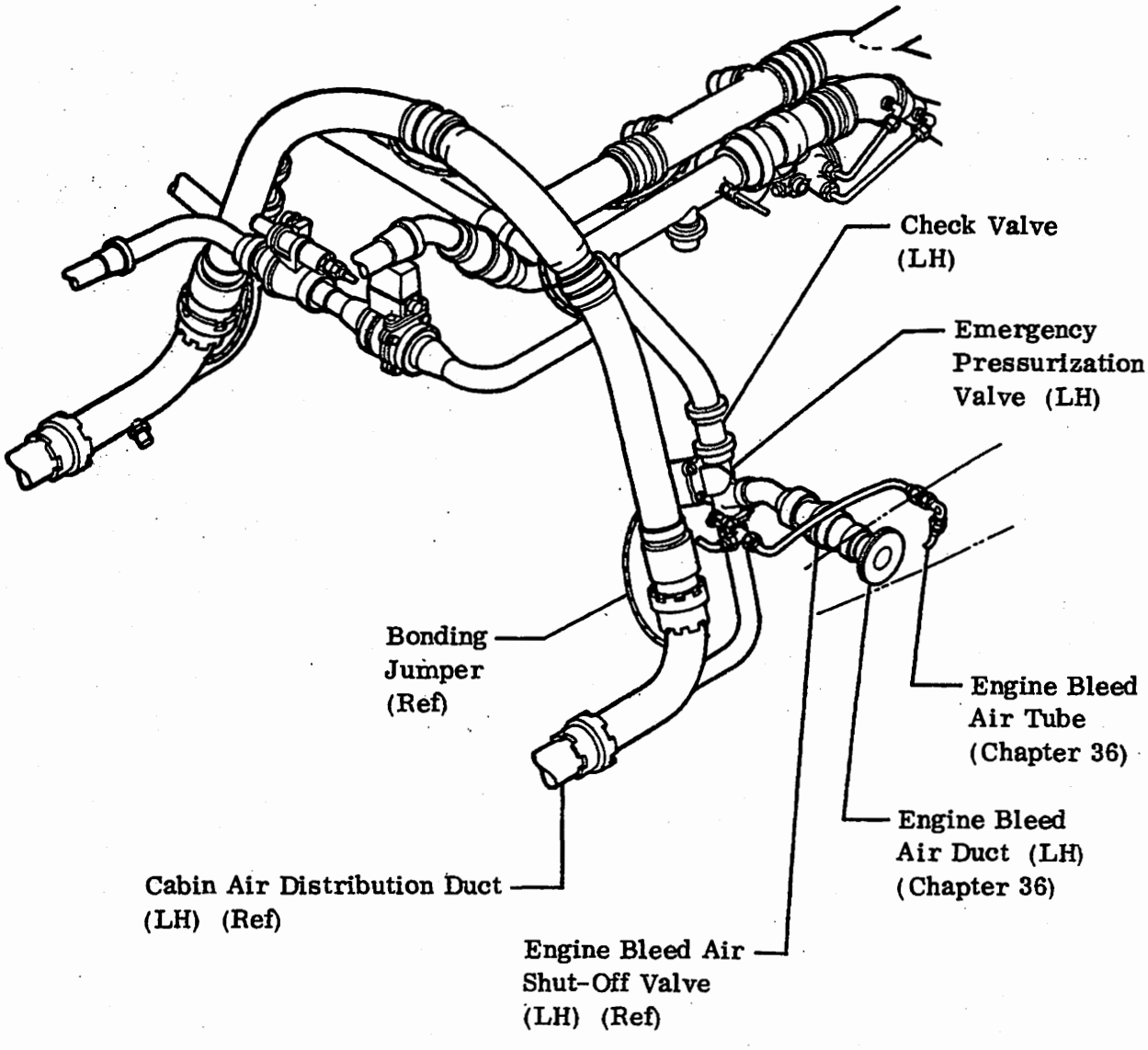
WARNING: ALL MAINTENANCE WORK SHOULD BE DONE IN A CLEAN ENVIRONMENT TO HELP MAINTAIN THE INTEGRITY OF THE SYSTEM. WHEN ANY TUBE OR HOSE ASSEMBLY IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ASSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED AND IDENTIFIED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE A SYSTEM MALFUNCTION.

CAUTION: ALL FITTINGS THAT MATE TO PLASTIC COMPONENTS SHALL BE TORQUED 15 (±5) INCH-POUNDS. WHEN ATTACHING A TUBE OR HOSE ASSEMBLY TO AN ADAPTER FITTING LOCATED IN A PLASTIC COMPONENT, HOLD ADAPTER FIRMLY IN PLACE WITH WRENCH BEFORE APPLYING APPROPRIATE TORQUE TO TUBE OR HOSE ASSEMBLY FITTING. (Refer to Chapter 20.)

NOTE: The following removal and installation procedures are applicable to either emergency valve.

A. Remove Emergency Pressurization Valve (See figure 201.)
   (1) Lower tailcone access door and disconnect aircraft batteries.
   (2) Disconnect electrical connector from valve.
   (3) Disconnect servo air pressure tube from valve. Cap all exposed fittings.
   (4) Remove safety wire from coupling half.
   (5) Loosen coupling halves and remove valve from aircraft.

B. Install Emergency Pressurization Valve (See figure 201.)
   (1) Install emergency pressurization valve and secure with coupling halves.
   (2) Tighten coupling halves hand tight and secure with safety wire.
   (3) Remove caps from fittings and connect servo air pressure tube to valve.
   (4) Connect electrical connector to valve.
   (5) Visually inspect installation to ensure components are installed properly.
   (6) Connect aircraft batteries and secure tailcone access door.



Emergency Pressurization Valve Installation
Figure 201

A13-100C

2. Adjustment/Test

A. Functional Test of Emergency Pressurization Valve (Aircraft 25-227 and Subsequent)

(1) Remove emergency pressurization valve from aircraft.

(2) With valve in emergency flow position (de-energized), inspect ball position in valve to verify that ports are aligned.

(3) Install valve in test setup as shown in figure 202, applying no power at this time.

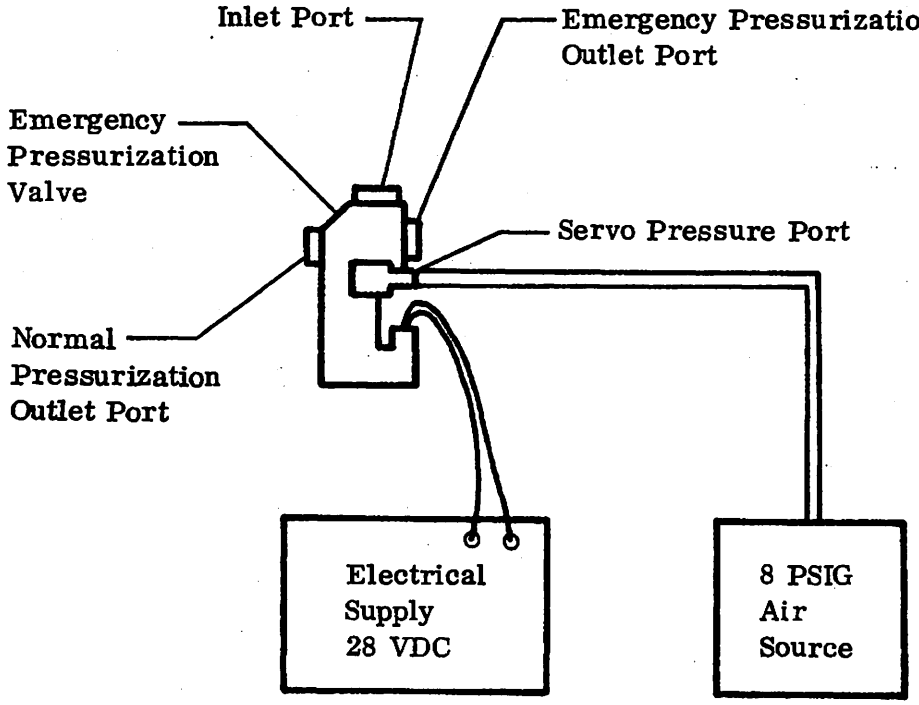
(4) Apply 28 VDC, energizing valve to normal flow position and measure actuation time. Actuation time shall not exceed 5 seconds.

(5) With valve in normal flow position (energized), inspect ball position in valve to verify that ports are aligned.

(6) Remove 28 VDC, de-energizing valve to emergency flow position and measure actuation time. Actuation time shall not exceed 3 seconds.

(7) Remove valve from test setup.

(8) Install emergency pressurization valve in aircraft.



Functional Test of Emergency Pressurization Valve
Figure 202

PRESSURE REGULATOR - MAINTENANCE PRACTICES

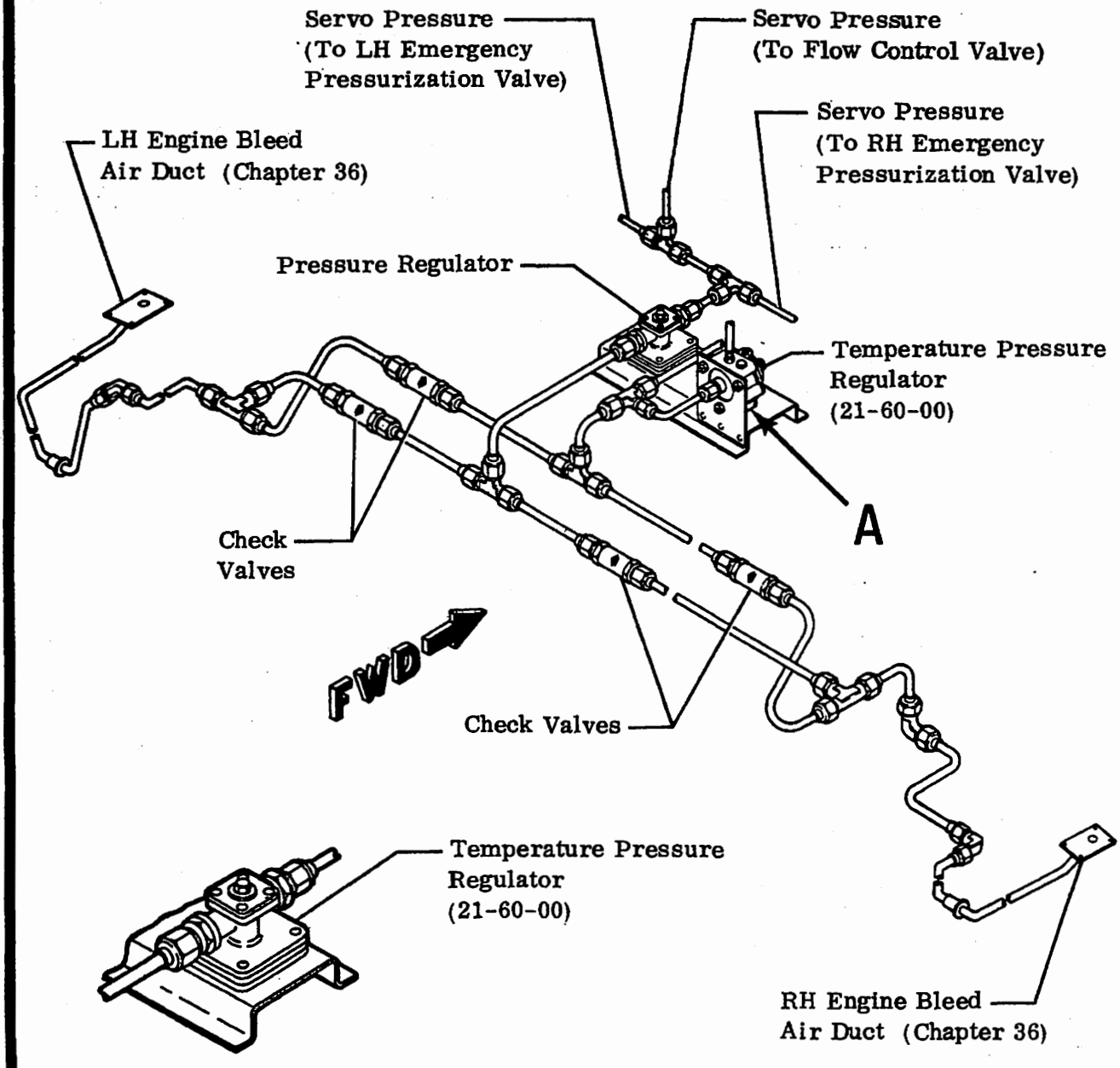
1. Removal/Installation

WARNING: ALL MAINTENANCE WORK SHOULD BE DONE IN A CLEAN ENVIRONMENT TO HELP MAINTAIN THE INTEGRITY OF THE SYSTEM. WHEN ANY TUBE OR HOSE ASSEMBLY IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ASSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED AND IDENTIFIED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE A SYSTEM MALFUNCTION.

CAUTION: ALL FITTINGS THAT MATE TO PLASTIC COMPONENTS SHALL BE TORQUED 15 (±5) INCH-POUNDS. WHEN ATTACHING A TUBE OR HOSE ASSEMBLY TO AN ADAPTER FITTING LOCATED IN A PLASTIC COMPONENT, HOLD ADAPTER FIRMLY IN PLACE WITH WRENCH BEFORE APPLYING APPROPRIATE TORQUE TO TUBE OR HOSE ASSEMBLY FITTING. (Refer to Chapter 20.)

A. Remove Pressure Regulator (See figure 201.)
   (1) Lower tailcone access door and disconnect aircraft batteries.
   (2) Disconnect tubing from pressure regulator. Cap all exposed fittings.
   (3) Remove attaching parts and pressure regulator from aircraft.

B. Install Pressure Regulator (See figure 201.)
   (1) Install pressure regulator on bracket and secure with attaching parts.
   (2) Remove caps from fittings and connect tubing to pressure regulator.
   (3) Visually inspect installation to ensure components are installed properly.
   (4) Connect aircraft batteries and secure tailcone access door.

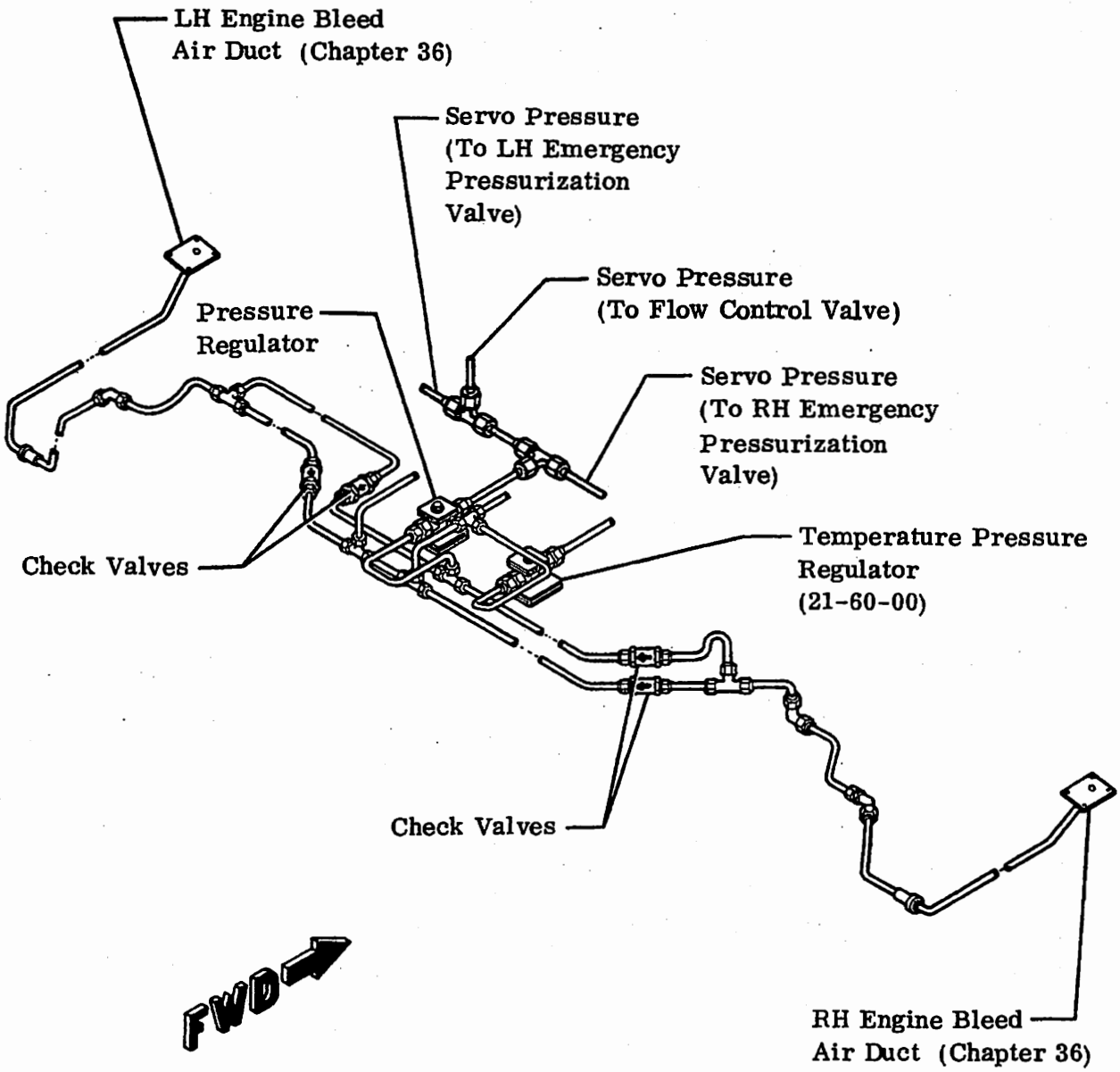


Detail A

Aircraft 25-234 thru 25-256

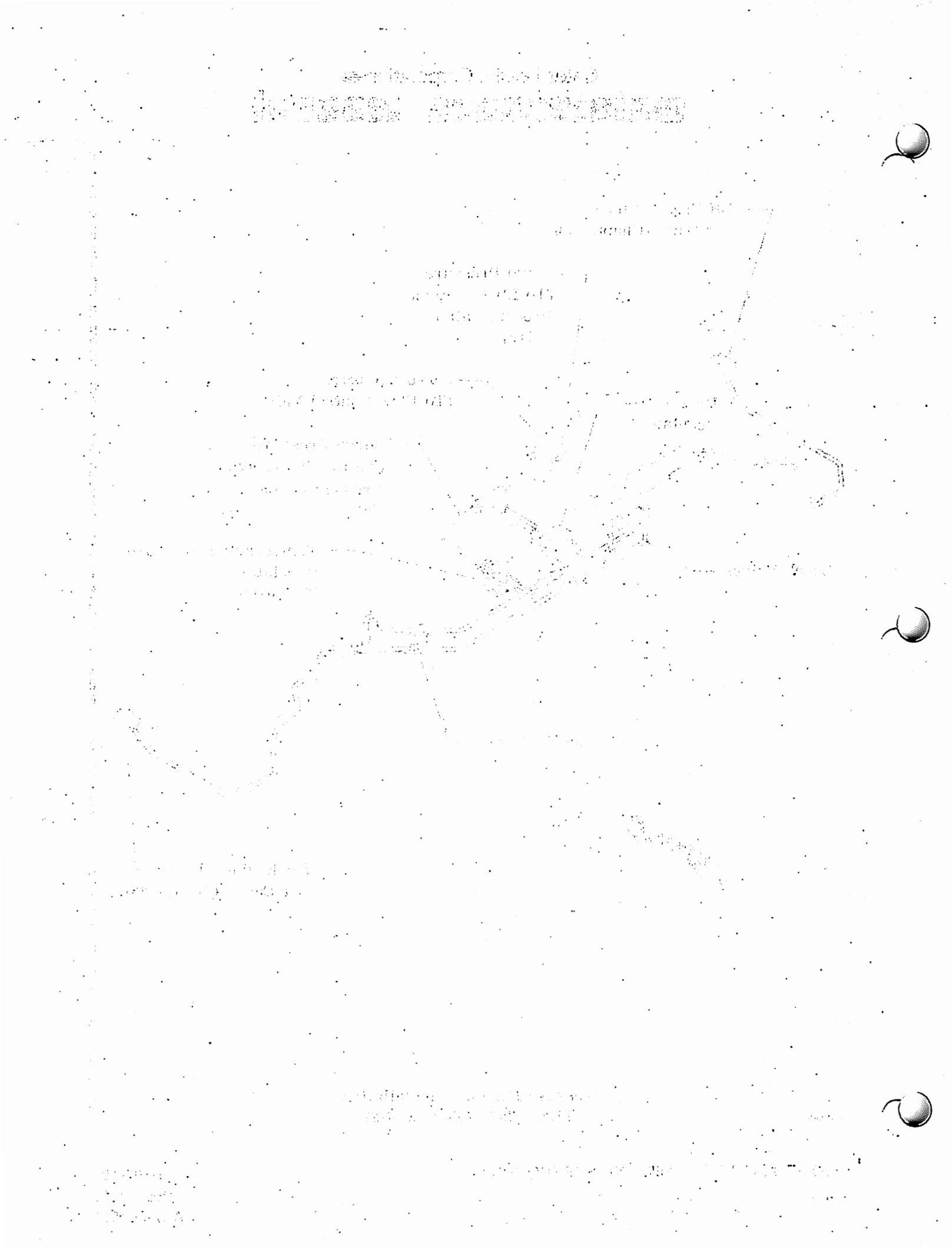
13-102C
13-103C-1
A13-116A

Pressure Regulator Installation
Figure 201 (Sheet 1 of 2)



Pressure Regulator Installation
Figure 201 (Sheet 2 of 2)

13-103C-2



HEATING - DESCRIPTION AND OPERATION

1. Description

A. Bleed Air Heating (See figure 1.)

(1) The precooled engine bleed air that is utilized to provide cabin pressurization is also utilized for the primary source of cabin heating. The bleed air temperature is controlled by the temperature control system (21-60-00).

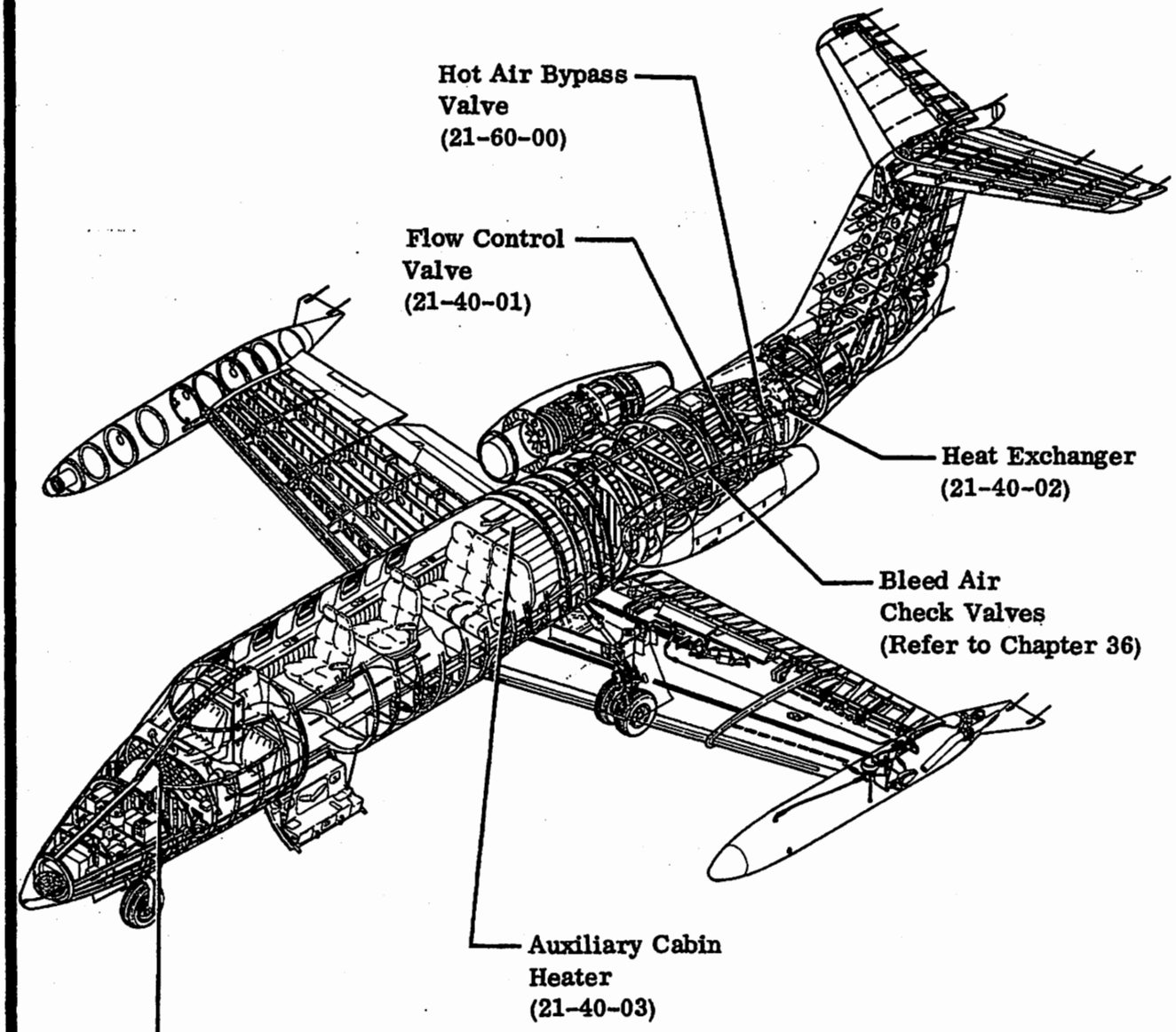
(2) The bleed air heating system consists of a flow control valve, bleed air check valves, heat exchanger, hot air bypass valve and indicator, an AIR BLEED Switch on Aircraft 25-061, 25-070 thru 25-226, a CABIN AIR Switch and AIRBLEED (BLEED AIR) Switches on Aircraft 25-227 and Subsequent. For further information on the hot air bypass valve and indicator, refer to 21-60-00.

(3) External anti-ice systems and footwarmer heat is provided by non-precooled engine bleed air. For further information pertaining to anti-ice systems and footwarmer heat, refer to Chapter 30.

(4) Component Description

(a) The flow control valve (21-40-01) consists of an absolute pressure regulator and a sonic venturi housed in a common assembly located in the bleed air ducting forward of the hot air bypass valve.

(b) The bleed air check valves on Aircraft 25-061, 25-070 thru 25-226 except 25-086 and 25-087, consist of a valve body and flapper assembly that is riveted to the inside of the bleed air ducting manifold above the coupling assembly as an integral part of the bleed air duct. On Aircraft 25-086 and 25-087, the bleed air check valves consist of a coupling body, two sleeve halves, two retainer rings, two O-rings, and a valve body assembled together and located in the engine bleed air duct coupling assembly. Flow arrows are stenciled on the sleeve halves, valve body, and coupling body to assure proper assembly. On Aircraft 25-227 and Subsequent the bleed air check valves consist of a valve body, O-ring, flapper assembly, and valve housing assembled together and located in the engine bleed air ducts adjacent to the emergency pressurization valves. A direction-of-flow arrow is located on the valve housing. For further information on the bleed air check valves, refer to Chapter 36.



Heating System Component Locator
Figure 1

(c) The heat exchanger (21-40-02) is installed in the tailcone equipment section between the ram air duct adapter and the discharge plenum assembly. The heat exchanger is a high effectiveness, two-pass, cross-counterflow plate-fin type unit. High pressure bleed air is ducted into the heat exchanger and routed through the core in cross-counterflow directions. Ram air is routed over the core channels and dumped into the tailcone discharge plenum assembly, resulting in a substantial reduction of bleed air temperature.

B. Auxiliary Cabin Heating (See figure 1.)

(1) The auxiliary cabin heater is installed to supplement the normal bleed air heating system.

(2) The heater system is powered by an external power source for ground operation or through the generator control box for inflight operation. The system consists basically of two heater circuits with a three-position system switch, a thermal switch, a thermal fuse, an auxiliary cabin heater safety switch, and a circuit breaker common to both heater circuits.

(3) Each heater circuit consists of two heater elements wired in parallel, a current limiter, and a heater control relay. The heater system is inoperative during refrigeration system operation; however, it utilizes the evaporator blower for cabin air circulation. The auxiliary heater safety switch completes the heater control relay circuit when the diverter doors are closed. On Aircraft 25-126 and Subsequent, an evaporator blower speed control circuit is incorporated. The blower speed control circuit allows the blower to run at approximately 10% of maximum speed until the heater elements have warmed up. The control circuit consists of a start cutout relay, a start relay, a low blower relay, and a diode network. On 25B/D Aircraft, the heater assemblies are installed in the lower portion of the evaporator duct. On 25C/F Aircraft, the heater assemblies are secured to the evaporator and blower assembly cover. All electrical connections are made directly to the heater assembly. The heater control relays and current limiters are installed on the left side of the tailcone equipment section aft of frame 26A. On Aircraft 25-126 and Subsequent, the heater control relays, current limiters, and blower speed control circuit are incorporated into a relay box. The relay box is located on the LH side of the tailcone equipment section aft of frame 26A.

NOTE: On Aircraft 25-126, electrical connections are made directly to relays. Aircraft 25-126 and Subsequent incorporate electrical connectors.

2. Operation

A. Bleed Air Heating

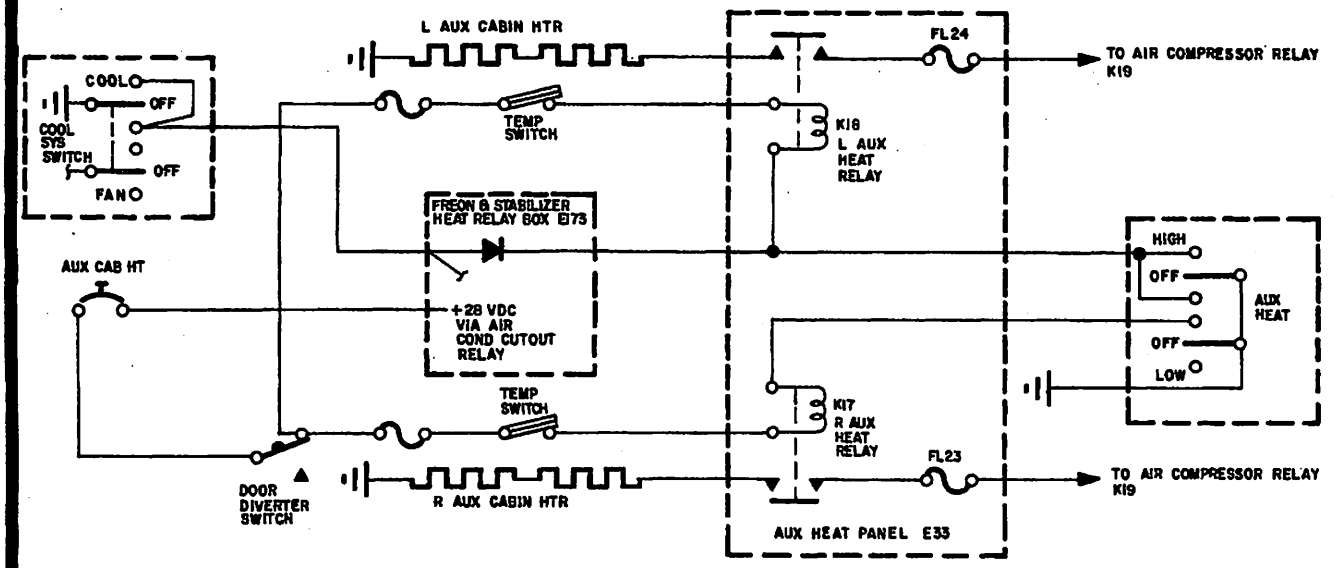
CAUTION: ON AIRCRAFT 25-061, 25-070 THRU 25-226, DO NOT USE MAX POSITION ON AIR BLEED (BLEED AIR) SWITCH WHILE ON THE GROUND. ON AIRCRAFT 25-227 AND SUBSEQUENT, DO NOT USE THE AIR BLEED (BLEED AIR) SWITCH(ES) IN THE EMER OR MAX POSITION WHILE AIRCRAFT IS ON GROUND. WITH THE AIRCRAFT ON THE GROUND, DO NOT PERFORM EXTENDED ENGINE OPERATION ABOVE 70% RPM WITH AIR BLEED (BLEED AIR) SWITCH SET TO NORM ON AIRCRAFT 25-061, 25-070 THRU 25-226, OR IN THE ON POSITION ON AIRCRAFT 25-227 AND SUBSEQUENT. WITH THE AIRCRAFT STATIC, THERE IS NO COOLING OF THE ENGINE BLEED AIR AND POSSIBLE DAMAGE TO THE AIR CONDITIONING COMPONENTS COULD RESULT. CABIN OVERHEATING AND DAMAGE TO CABIN FURNISHINGS MAY ALSO RESULT.

(1) On Aircraft 25-061, 25-070 thru 25-226, with the Air Bleed Switch set to NORM or on Aircraft 25-227 and Subsequent, with the Cabin Air Switch set to ON and the LH and RH Air Bleed (Bleed Air) Switches set to ON, engine bleed air is admitted through the flow control valve to the heat exchanger. The engine bleed air is precooled in the heat exchanger by ram air entering the dorsal inlet, passing through the heat exchanger, and then dumping into the tailcone. The amount of cooling accomplished by the heat exchanger is dependent upon the position of the hot air bypass valve. (For additional information on the hot air bypass valve, refer to 21-60-00.) The precooled air is then ducted through the air distribution lines into the cabin area. If a large amount of airflow is desired to remove fumes or smoke from the cabin, on Aircraft 25-061, 25-070 thru 25-226, set Air Bleed Switch to MAX.. This energizes a solenoid on the flow control valve overriding the venturi and fully opening the flow control valve.
On Aircraft 25-227 and Subsequent, setting the LH and RH Air Bleed (Bleed Air) Switches to EMER provides full flow of engine bleed air directly into the cabin. Temperature controls will not be available with both Air Bleed (Bleed Air) Switches set to EMER. An overtemperature switch installed in the RH and LH ducting will close and illuminate the applicable CAB AIR HT warning light on the glareshield. This alerts the crew of an overheating condition within the cabin.

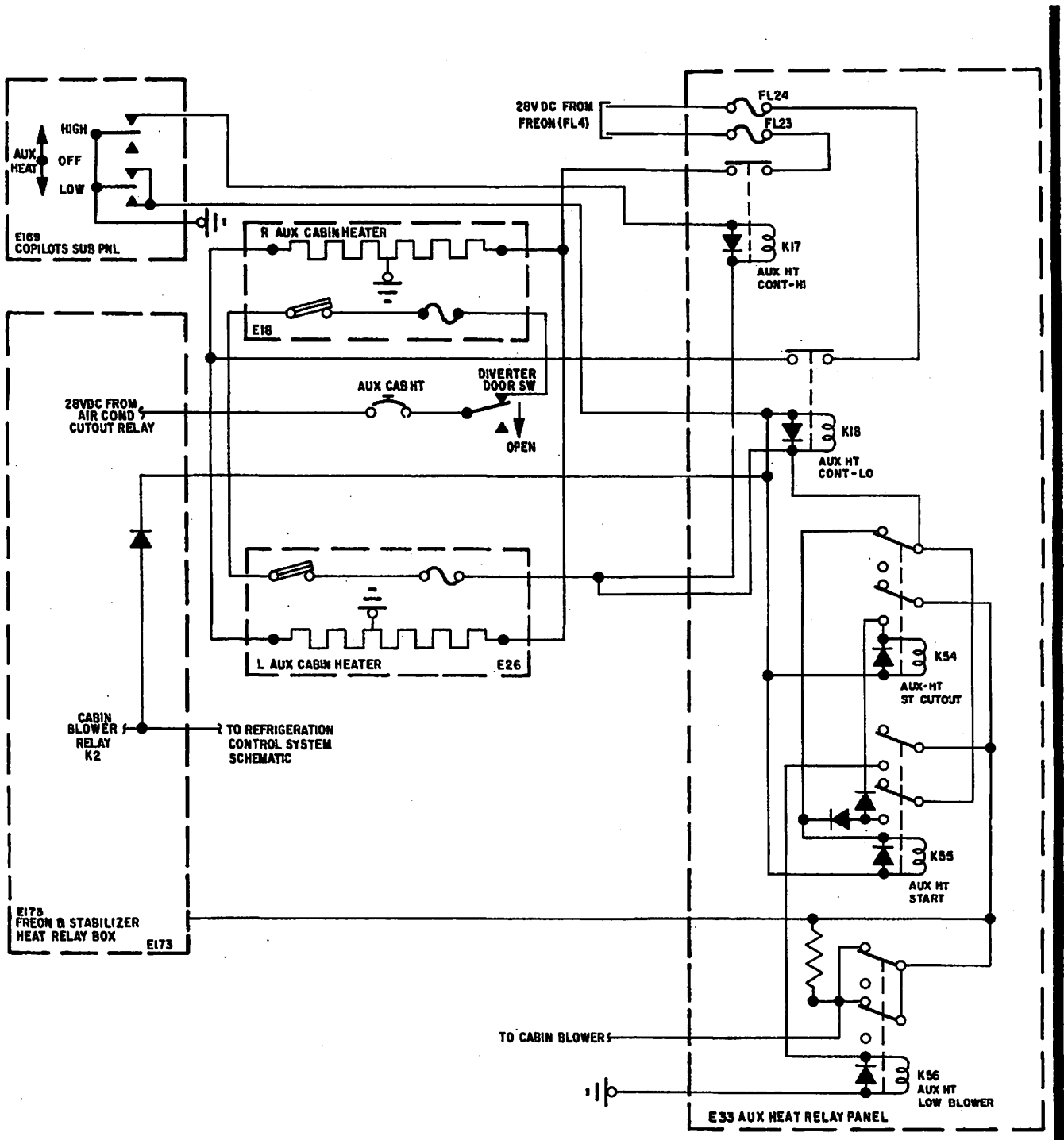
B. Auxiliary Cabin Heating

(1) On Aircraft 25-070 thru 25-125, with the AUX HEAT Switch set to HIGH and the diverter doors closed, (allowing full air flow across heater units) a ground circuit is completed through the auxiliary heater safety switch for both heater control relays and the evaporator blower. With the AUX HEAT Switch set to LOW and the diverter doors closed, a ground circuit is completed for one heater control relay and the evaporator blower. In either switch position, the evaporator blower circulates cabin air over the heating elements. A thermoswitch is installed approximately 1-inch from one of the heater elements. Radiated heat from the element cycles the thermoswitch. The thermoswitch is set to open at approximately 150° F and close at approximately 125° F.

(2) On Aircraft 25-126 and Subsequent, with the Auxiliary Heat Switch set to LOW and the diverter doors closed (allowing full air flow across the heater units) two circuits are completed. (1) A power circuit is completed through the diverter door switch, the heater fuses, and the thermoswitches to the auxiliary heater low control relay (K18) and (2) a ground circuit is completed through the Auxiliary Heat Switch to energize the auxiliary heater low control relay (K18). The relay energizes and applies 28 vdc power to the RH and LH aft heater elements. The 28 vdc applied to the auxiliary heater low control relay (K18) is also applied to a set of contacts of the auxiliary heater start cutout relay (K54) and to a set of contacts of the auxiliary heater start relay (K55). Relay (K55) energizes, providing 28 vdc to energize relay (K54) and completes a power circuit from the evaporator blower motor circuit to energize relay (K56). As relay (K54) is energized, a locking voltage is applied to the coil of relay (K54) from the evaporator blower motor circuit. Relay (K56) energizes and completes a power circuit through a voltage-dropping resistor to the evaporator blower motor. This allows the motor to run at approximately 10% of the motor's full speed. When the heaters reach approximately 150° F, the thermoswitches will open and remove 28 vdc from the low control relay (K18), start relay (K55), and start cutout relay (K54). The start cutout relay will remain energized by the locking voltage from the evaporator blower motor circuit. The start relay (K55) will deenergize and remove 28 vdc from blower relay (K56). The blower relay (K56) will deenergize and apply full 28 vdc to the evaporator motor (bypassing the voltage-dropping resistor). When the air temperature reaches approximately 125° F the thermoswitches close and complete the 28 vdc circuit to the low control relay (K18). The relay energizes and applies 28 vdc to the RH and LH aft heater elements. Since start cutout relay (K54) is energized, the circuit to start relay (K55) is open and will not energize. The heater elements will continue cycle as required and the evaporator blower motor will operate at normal speed. Operation of the system with the Auxiliary Heat Switch set to HIGH is the same as the LOW, except all heater elements will heat.



Auxiliary Cabin Heater Electrical Control Schematic
Figure 2 (Sheet 1 of 2)

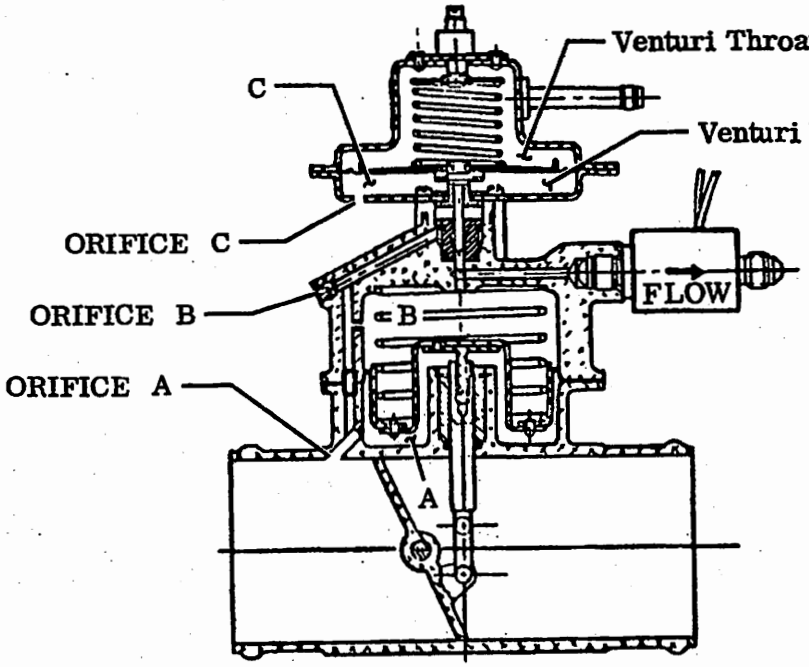


Auxiliary Cabin Heater Electrical Control Schematic
Figure 2 (Sheet 2 of 2)

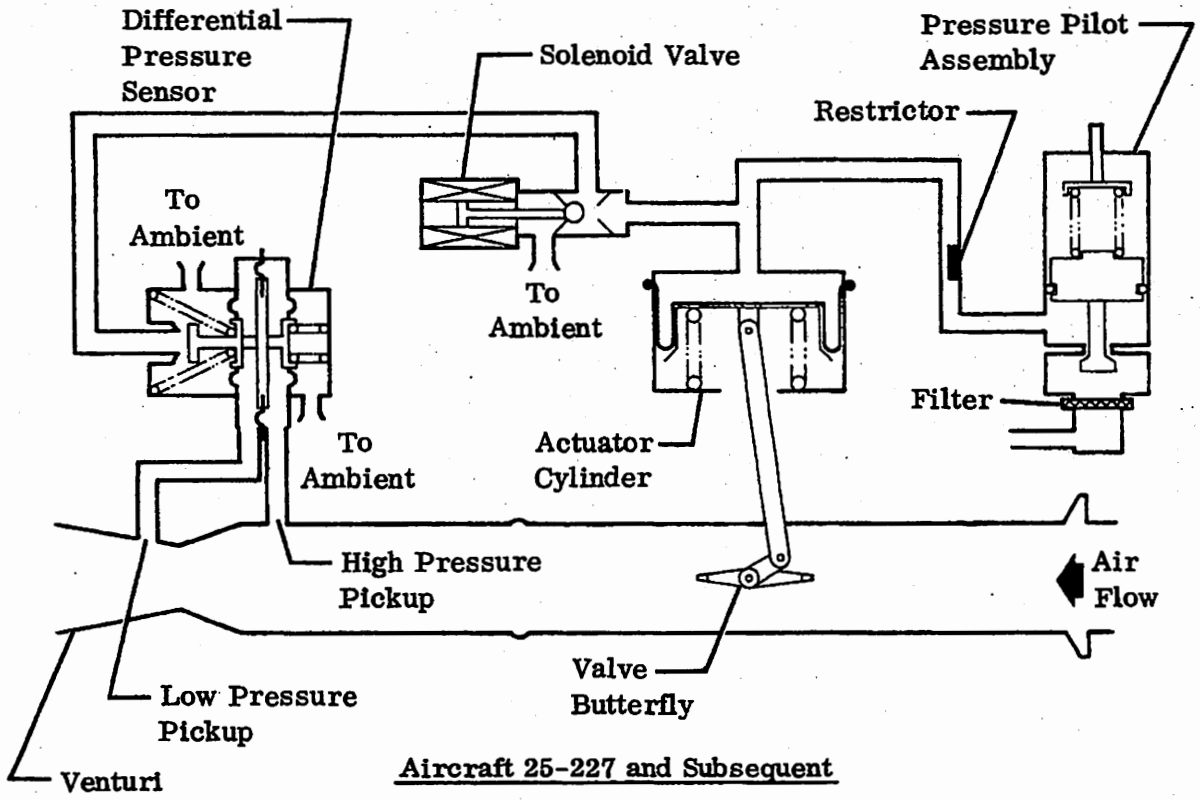
C. Component Operation

(1) The flow control valve (See figure 3.) on Aircraft 25-061, 25-070 thru 25-226, is shown in the energized position (AIR BLEED Switch set to OFF). The pressure in chambers A and B is equalized, and the spring holds the valve in the closed position. When the AIR BLEED Switch is set to NORM, the pressure in chamber B is less than in A; and the valve moves to the open position. When the differential across the venturi reaches the setting of the pilot regulator, the pilot regulator opens to admit additional air to chamber B which holds the valve in the proper position to maintain flow. When the AIR BLEED Switch is set to MAX, the solenoid valve in the upstream static line closes and stops airflow into chamber C. The trapped air escapes through orifice C driving the valve to full open and allowing full bleed airflow into the cabin.

On Aircraft 25-227 and Subsequent, the flow control valve is shown in the deenergized position (CABIN AIR Switch set to ON). With the solenoid valve deenergized, servo air pressure is admitted through the pressure pilot assembly filter into the pressure pilot assembly. The servo air pressure is sensed in the actuator chamber and in the differential pressure sensor, where the air pressure is vented overboard. As bleed air flows through the venturi, the negative pressure buildup is sensed on one side of the differential pressure sensor and a pressure is sensed on the opposite side. When this happens, the path for the air pressure, picked up through the pressure pilot, is restricted, thus causing a buildup of pressure in the actuator cylinder. The increasing pressure causes the actuator to move the valve closed. This limits the air flow going through the venturi. When the CABIN AIR Switch is set to OFF, the solenoid valve is energized (closed), blocking the bleed path for the air pressure. The air pressure builds up within the cylinder actuator and drives the valve butterfly closed, stopping air flow.



Aircraft 25-061, 25-070 thru 25-226



Aircraft 25-227 and Subsequent

Flow Control Valve Schematic
Figure 3

FLOW CONTROL VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

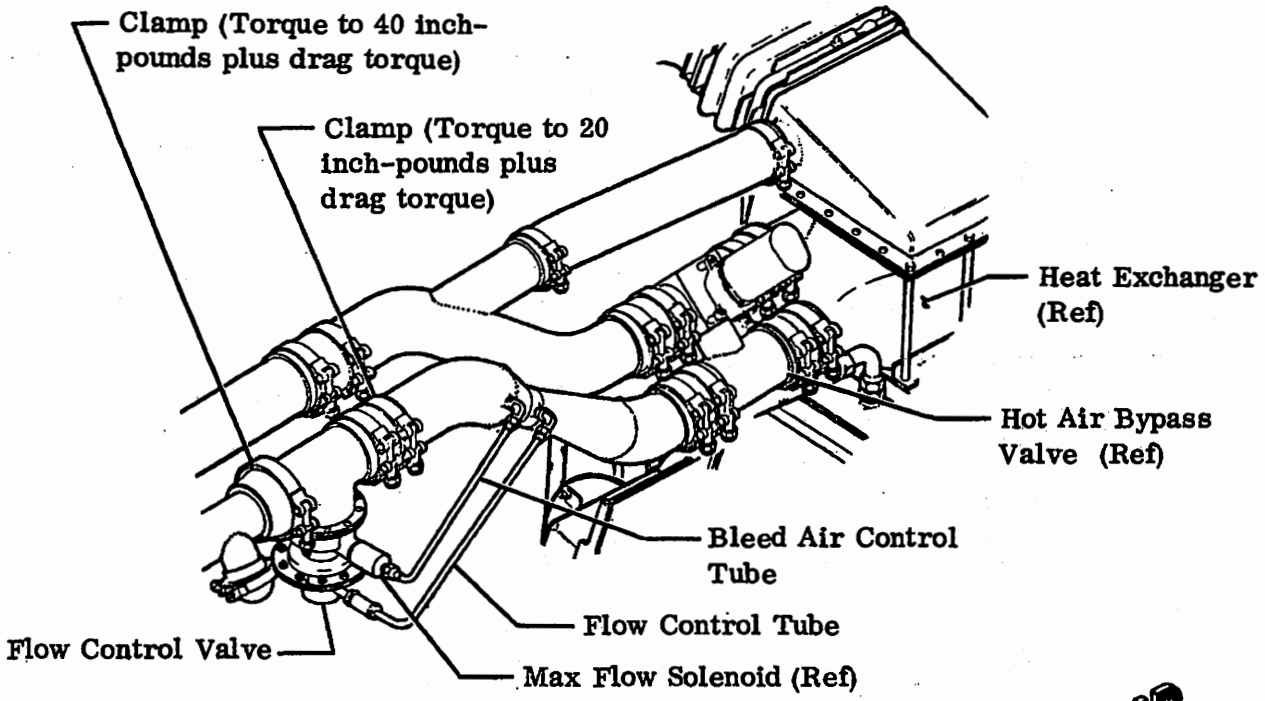
CAUTION: ON AIRCRAFT 25-227 AND SUBSEQUENT, WHEN REMOVING FLOW CONTROL VALVE, ASSURE THAT TEMPERATURE CONTROL PNEUMATIC LINES AND FITTINGS ARE TIGHTLY CAPPED. DIRT OR OTHER CONTAMINANTS MAY AFFECT THE OPERATION OF THE TEMPERATURE CONTROL SYSTEM.

A. Remove Flow Control Valve (See figure 201.)
   (1) Lower tailcone access door and disconnect aircraft batteries.
   (2) Disconnect bleed air control tube and flow control tube from venturi duct and flow control valve.
   (3) On Aircraft 25-061, 25-070 thru 25-226, disconnect electrical connector from flow control valve.
   (4) On Aircraft 25-227 and Subsequent, disconnect servo pressure tube from flow control valve. Cap all exposed fittings.
   (5) Loosen clamps and sleeves securing flow control valve to venturi duct.
   (6) Loosen coupling securing flow control valve to bleed air manifold.

B. Install Flow Control Valve (See figure 201.)
   (1) Install flow control valve and gasket on bleed air manifold and secure with coupling. Do not torque coupling at this time.
   (2) Connect bleed air control tube and flow control tube to venturi duct assembly and flow control valve as shown.
   (3) Position sleeve and secure flow control valve to venturi duct. Torque clamp to 20 inch-pounds plus drag torque.
   (4) Torque coupling, installed in step (1) to 40 (±4) inch-pounds plus drag torque.

NOTE: Drag torque is the amount of torque required to overcome the friction of any self-locking nut. This nut friction (drag torque) must be added to the torque callout to assure proper torquing. The tailcone bleed air ducting incorporates stainless steel clamps, nuts and bolts, which require higher nut-friction than the standard self-locking nuts. In some instances nut friction may exceed the required torque values.

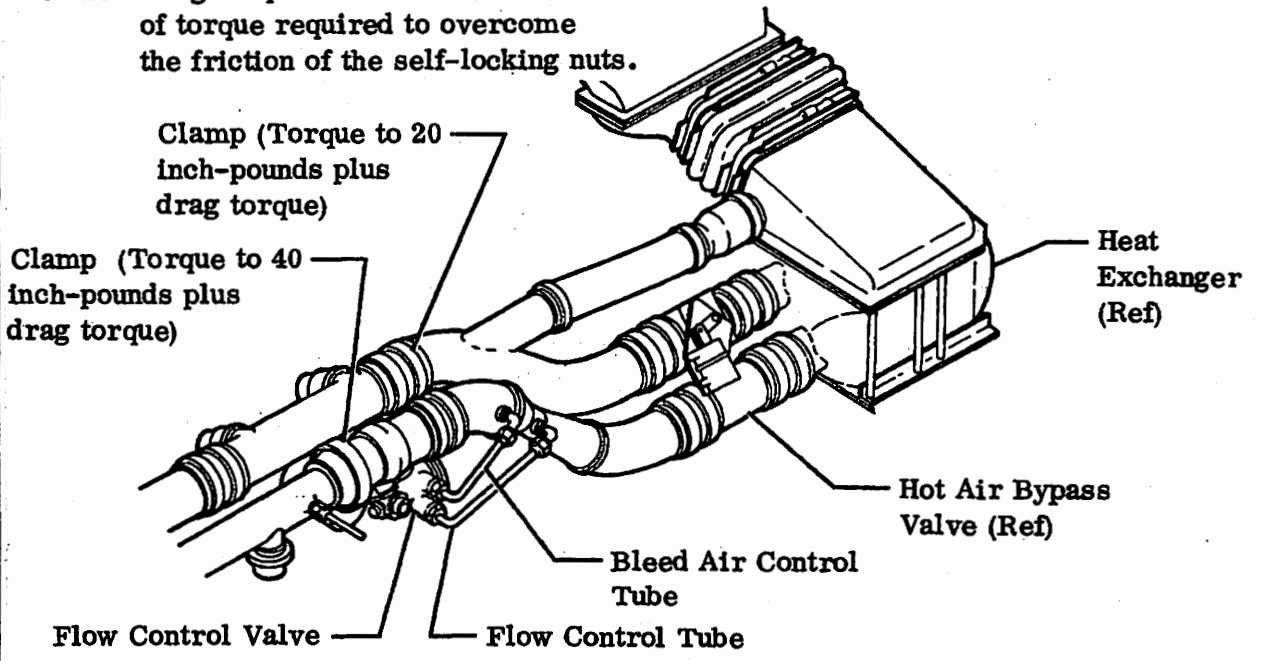
   (5) On Aircraft 25-061, 25-070 thru 25-226, connect electrical connector to flow control valve.
   (6) On Aircraft 25-227 and Subsequent, connect servo pressure tube to flow control valve.
   (7) Connect aircraft batteries and secure tailcone access door.



Aircraft 25-061, 25-070 thru 25-226

FWD

NOTE: Drag torque is the amount of torque required to overcome the friction of the self-locking nuts.



Aircraft 25-227 and Subsequent

Flow Control Valve Installation
Figure 201

13-82C
13-100C

HEAT EXCHANGER - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Heat Exchanger (See figure 201.)

(1) Lower tailcone access door.

(2) Remove hot air bypass valve. (Refer to 21-60-07.)

(3) Loosen clamps and remove ram air duct.

(4) Remove attaching parts and heat exchanger from aircraft.

B. Install Heat Exchanger (See figure 201.)

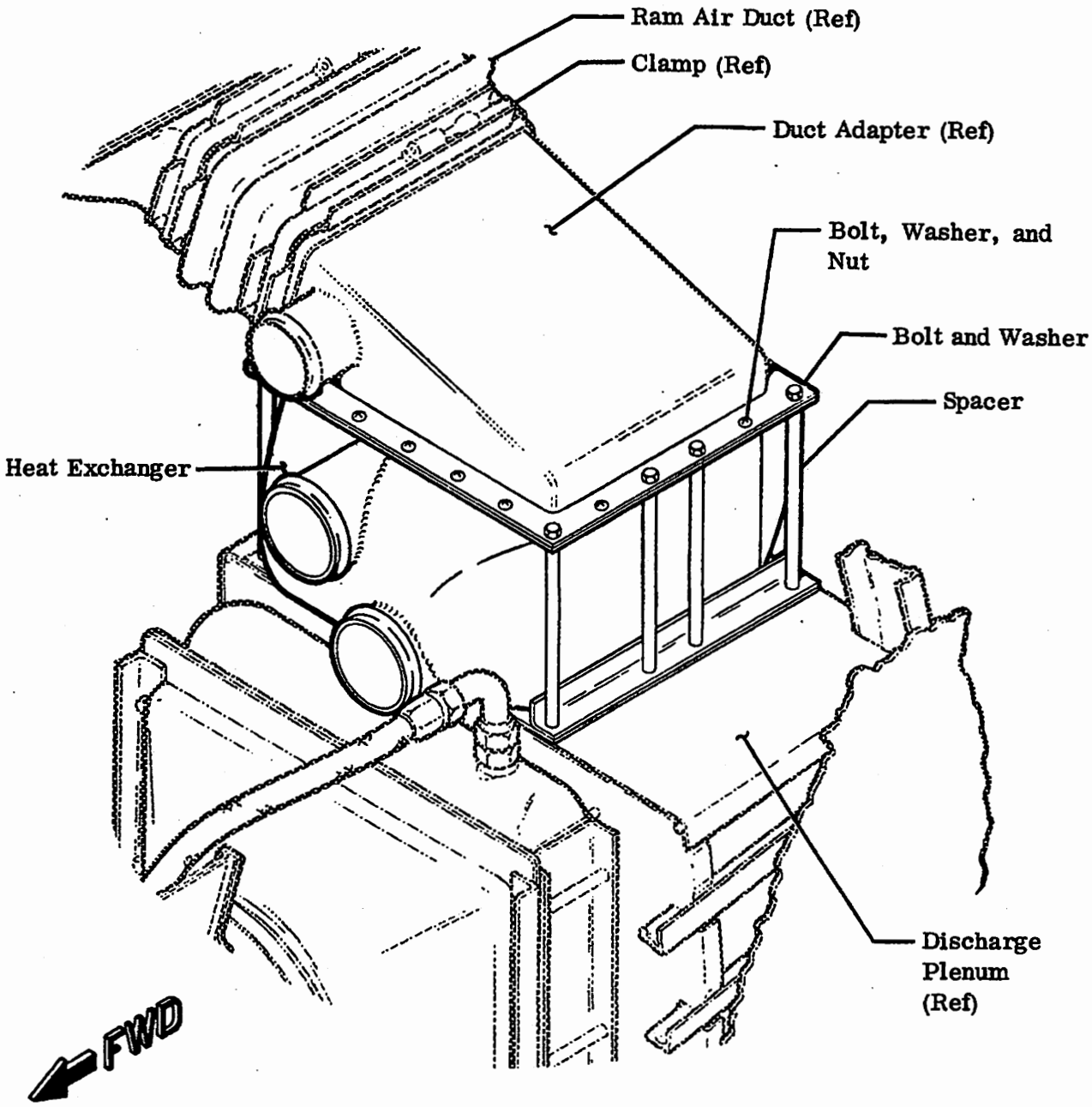
(1) Install heat exchanger and secure with attaching parts.

(2) Install ram air duct and secure with clamps. Torque clamps to 20 inch-pounds plus drag torque.

NOTE: Drag torque is the amount of torque required to overcome the friction of any self-locking nut. This nut friction (drag torque) must be added to the torque callout to assure proper torquing. The tailcone bleed air ducting incorporates stainless steel clamps, nuts, and bolts, which require higher nut-friction than the standard self-locking nuts. In some instances, nut friction may exceed the required torque values.

(3) Install hot air bypass valve. (Refer to 21-60-07.)

(4) Secure tailcone access door.



Heat Exchanger Installation
Figure 201

13-38D-1

AUXILIARY CABIN HEATER - MAINTENANCE PRACTICES

NOTE: Maintenance practices consist of replacement of defective components and adjustment of the diverter door switches. The heater assemblies are replaced as entire units.

1. Removal/Installation

A. Remove Heater Assembly (See figure 201.) (25C/F Aircraft)

(1) Remove equipment and upholstery as required to gain access to evaporator and blower installation.
(2) Loosen clamp and disconnect drain tube from evaporator and blower assembly.
(3) Disconnect electrical wiring or electrical connector(s) (if installed) from evaporator and blower assembly. Tag wiring.
(4) Loosen clamps and disconnect ducts from forward cockpit cooling fan transition.
(5) Disconnect refrigeration quick-disconnects.
(6) Support evaporator and blower assembly and remove attaching parts from support brackets. Remove evaporator and blower assembly from aircraft.
(7) Remove attaching parts securing cover to evaporator and blower assembly.
(8) Raise cover sufficiently to gain access to electrical connector and disconnect.
(9) Remove cover from evaporator and blower assembly.
(10) Disconnect wiring from heater. Tag wiring.
(11) Remove attaching parts and heater assembly from cover.

B. Install Heater Assembly (See figure 201.) (25C/F Aircraft)

(1) Install heater assembly on cover and secure with attaching parts.
(2) Connect electrical wiring to heater assembly.
(3) Place cover on evaporator and blower assembly and connect electrical wiring or connector (if installed).
(4) Install cover on evaporator and blower assembly and secure with attaching parts.
(5) Install evaporator and blower assembly and secure with attaching parts.
(6) Connect refrigeration quick-disconnects.
(7) Connect ducts to forward cockpit cooling fan transition and secure with clamps.
(8) Connect electrical wiring or electrical connector(s) to evaporator and blower assembly.
(9) Connect drain tube and secure with clamp.
(10) Install previously removed equipment and upholstery.
(11) Check cabin heater safety switch adjustment.

C. Remove Heater Assembly (See figure 201.) (25B/D Aircraft)
   (1) Remove equipment and upholstery as required to gain access to evaporator and blower ducts.
   (2) Remove attaching parts and lower heater assembly sufficiently to gain access to electrical wiring.
   (3) Disconnect electrical wiring from heater assembly. Tag wiring.

D. Install Heater Assembly (See figure 201.) (25 B/D Aircraft)
   (1) Connect electrical wiring to heater assembly.
   (2) Install heater assembly and secure with screws.
   (3) Install previously removed equipment and upholstery.

2. Adjustment/Test

A. Adjust Diverter Door Safety Switch (See figure 201.) (25C/F Aircraft)
   (1) Remove evaporator and blower assembly.
   (2) Remove attaching parts and cover from evaporator and blower assembly.
   (3) Set diverter door open a maximum of 1.50 inches. Loosen setscrew and adjust diverter door cam until switch actuation occurs (no continuity between switch contacts C and NC). Tighten setscrew.
   (4) Cycle diverter doors to assure proper switch setting.
   (5) Install evaporator and blower assembly.

B. Adjust Diverter Door Safety Switch (See figure 201.) (25B/D Aircraft)
   (1) Assure that diverter doors are completely closed. Check for continuity between switch contacts C and NC.
   (2) Open diverter doors a maximum of 1/8 inch. Loosen adjustment screw and adjust switch until switch actuation occurs (no continuity between switch contacts C and NC). Tighten adjustment screw.

C. Operationally Check Auxiliary Cabin Heater

(1) Apply external power to aircraft.

(2) Open diverter door.

(3) Set AUX HEAT Switch to LOW. Verify that heater coils are not heating. Cabin blower shall be operating at high speed. Check for air flow from diverter door opening on bottom of duct.

(4) Close diverter doors. Verify that both rear heater coils are heating. Cabin blower shall be operating at a low speed.

NOTE: After either rear coil thermostat opens, cabin blower shall automatically switch to high speed.

(5) When cabin blower is operating at high speed, turn cabin blower speed control to "mid" position. This control shall have no effect on blower speed.

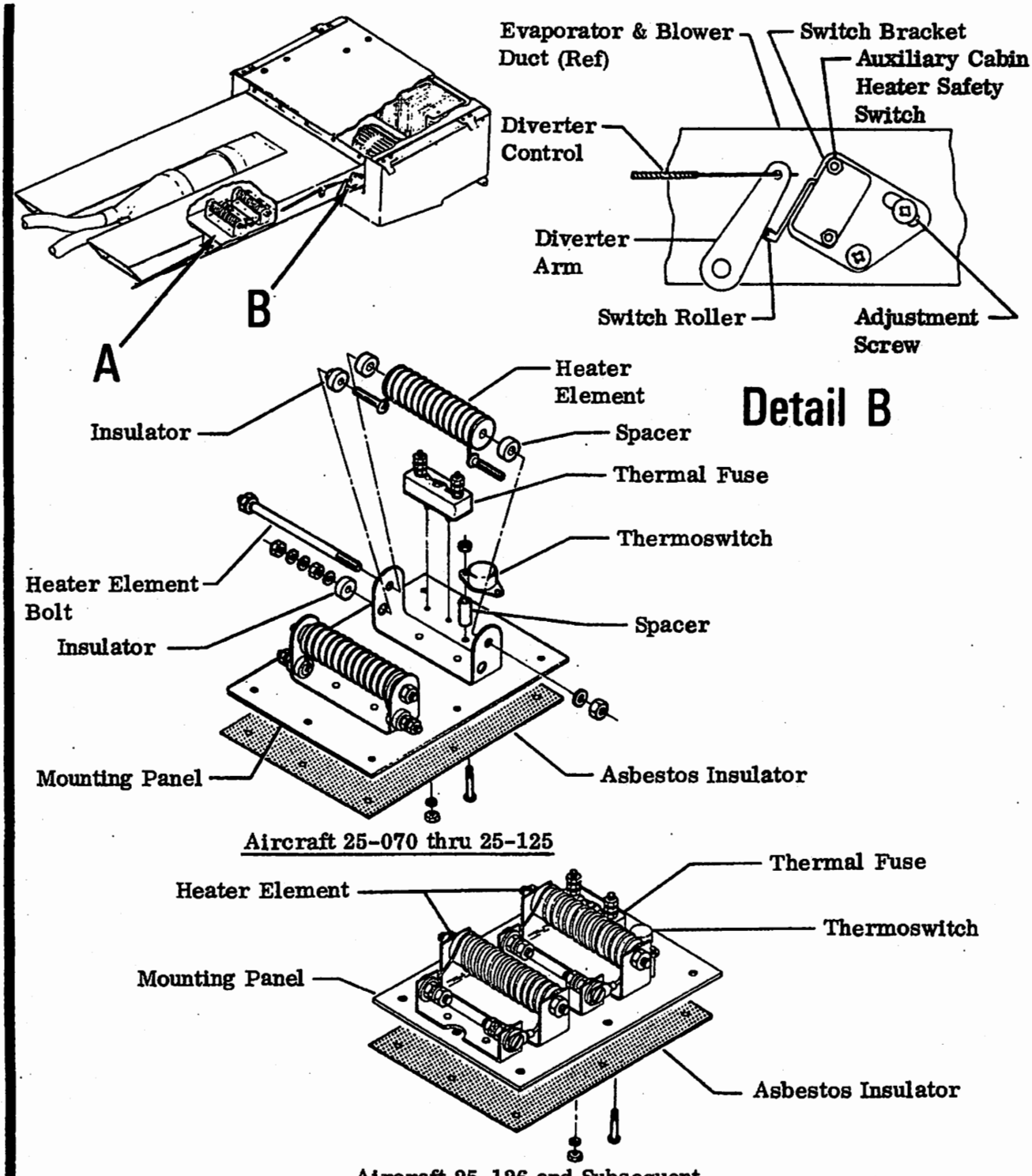
(6) Set AUX HEAT Switch to OFF.

(7) After waiting a few moments, set AUX HEAT Switch to HIGH. Verify that both sets of front and rear heater coils are heating.

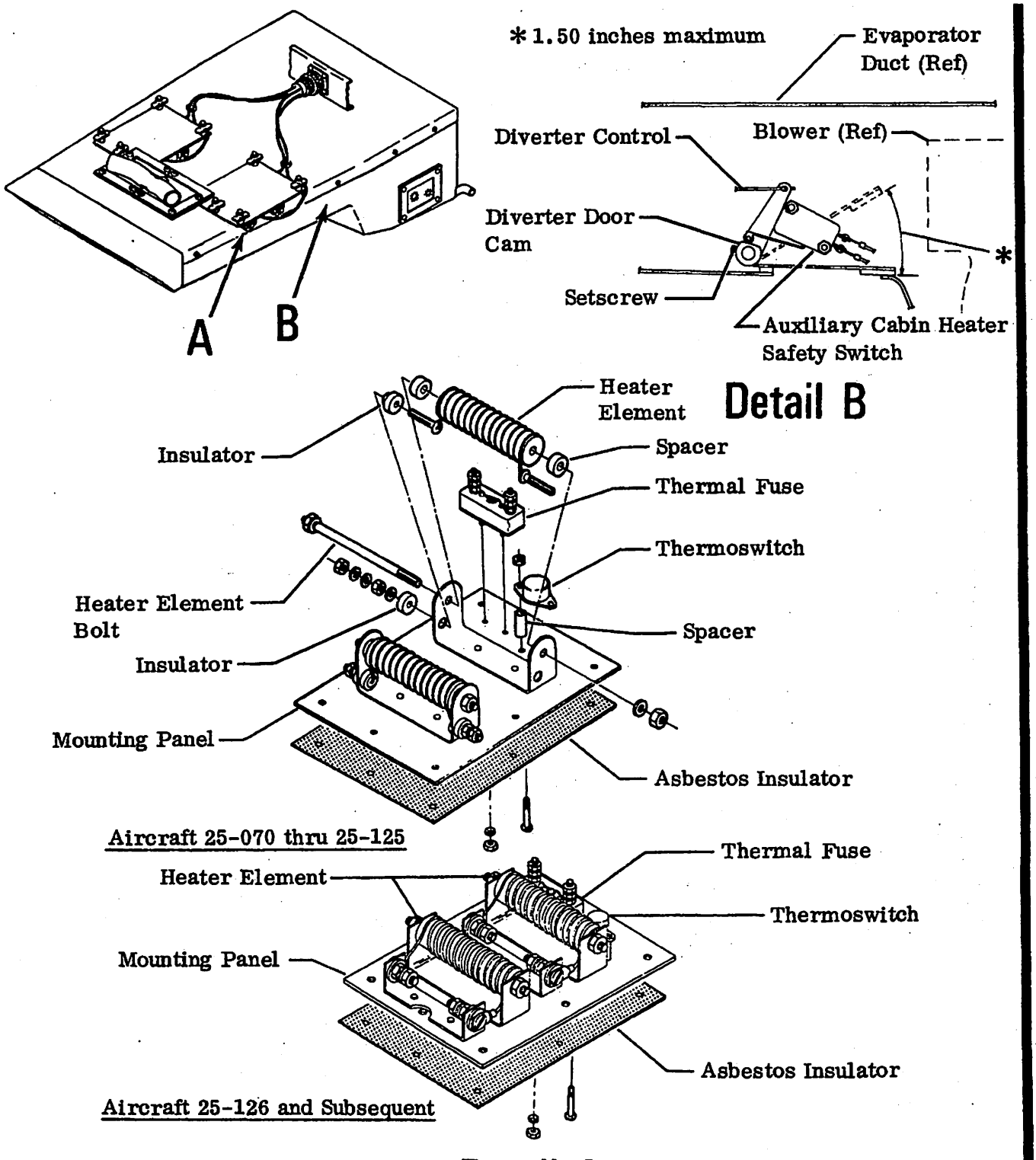
NOTE: Before proceeding with next step, clear personnel from tailcone.

(8) Set COOL-FAN Switch to COOL. Verify that air conditioner starts and heating coils cut off.

(9) Set COOL-FAN Switch to OFF. Disconnect external power. Verify that heater coils cut off.



Auxiliary Cabin Heater System Installation
Figure 201 (Sheet 1 of 2)



Auxiliary Cabin Heater System Installation
Figure 201 (Sheet 2 of 2)

COOLING - DESCRIPTION AND OPERATION

1. Description (See figure 1.)

WARNING: DO NOT OPERATE REFRIGERATION SYSTEM WITH CONDENSER AIR OUTLET BLOCKED.

NOTE: The refrigeration system is optional on 25C/F Aircraft. 25C/F Aircraft that are not equipped with the refrigeration system will have a cabin blower system installed. For information concerning the cabin blower system, refer to 21-21-00.

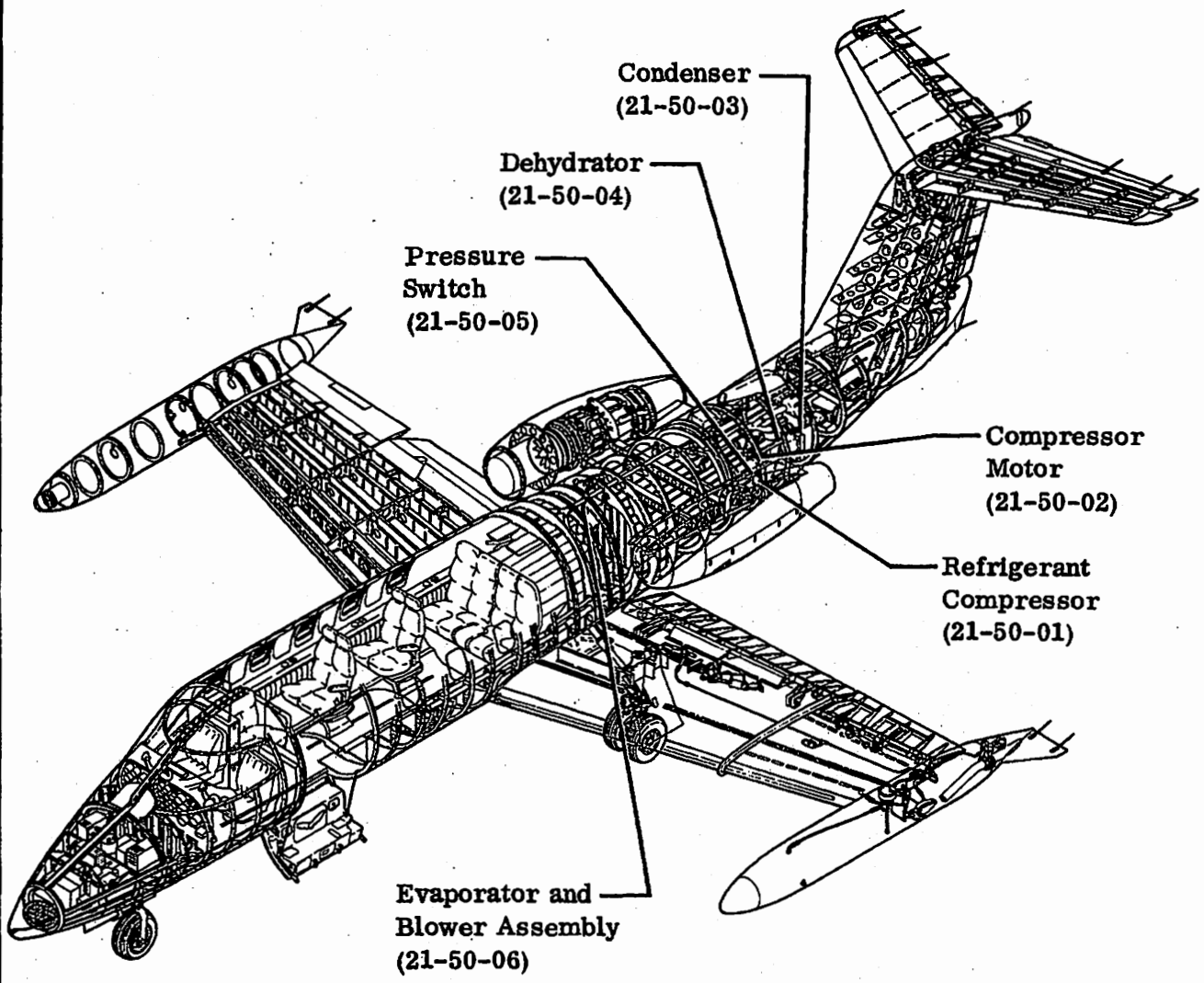
A. The refrigeration system is installed for ground cooling, inflight cooling at lower altitudes, and cabin dehumidification.

B. The system must be powered by operating one engine at idle or by an auxiliary power unit.

C. The system consists of a refrigerant compressor, compressor motor, condenser, dehydrator, pressure switch, an evaporator and blower assembly, cockpit cooling fan, freon control relay, and system switches.

D. Component Description

(1) On Aircraft 25-061, 25-070 thru 25-342, the compressor is a two-cylinder unit used to pump and compress refrigerant vapor. The compressor is belt-driven by the compressor motor. The pistons draw refrigerant vapor into the suction port on the intake strokes. On the compression strokes, the vapor is compressed and discharged out the discharge port into the discharge line. Two port adapters are installed on the compressor cylinder head. The adapters provide a connection for the discharge and suction lines and service connections. The word DISCHARGE on the cylinder head designates the discharge service valve port. The word SUCTION on the cylinder head designates the suction service valve port. The compressor is attached to the motor/compressor mounting panel with four bolts which are torqued to 14 foot-pounds. The compressor crankcase oil level shall be checked only when the system has lost the complete refrigerant charge or signs of oil loss are noted. The system refrigerant charge must be dumped prior to checking oil level. (Refer to Chapter 12.) On Aircraft 25-343 and Subsequent, the compressor is five-cylinder, wobble-plate unit, belt-driven by the compressor motor. The pistons draw refrigerant vapor into the suction port on intake strokes. On compression strokes, the vapor is compressed and discharged through the discharge port into the discharge line. A refrigerant pressure switch is installed in the discharge service port of the compressor. The compressor is attached



Refrigeration System Components Locator
Figure 1

to the motor/compressor mounting panel with a brace and 4 bolts torqued to 14 foot-pounds each. The compressor crankcase oil level shall be checked only when the system has lost the complete refrigerant charge or signs of oil loss are noted. The system refrigerant charge must be dumped prior to checking oil level. (Refer to Chapter 12.)

(2) The compressor motor is a 28-vdc unit which drives the refrigerant compressor via a V-belt. The motor has a 3-3/4 hp rating at 7000 rpm and is powered through a 150-ampere current limiter. The motor is secured to the mounting panel by four bolts. The bolts are torqued to 14 foot-pounds each.

(3) The refrigerant condenser is a plate-and-fin type unit. High-pressure, high-temperature vapor enters the condenser from the compressor. This vapor, being much hotter than the air passing over the condenser surface, changes to a liquid. Heat from the condenser is removed by a fan mounted on the compressor motor shaft. Two ports, designated IN and OUT, are installed in the condenser. The IN port is connected to the refrigerant compressor DISCHARGE port by a high-pressure, flexible hose. The OUT port is connected to the dehydrator by metal tubing.

(4) The dehydrator removes small traces of moisture that may remain in the system after purging and evacuating. A sight glass to observe refrigerant flow is located in the top of the dehydrator assembly. On Aircraft 25-303 and Subsequent, an additional sight glass is installed in the dehydrator outlet tube which runs from the dehydrator assembly, above the cabin headliner, and forward to the air conditioner evaporator. The additional sight glass, located at FS 484, is used to help facilitate refrigerant check. Liquid refrigerant and occasionally some refrigerant vapor from the condenser enters the dehydrator reservoir. The liquid is heavier than the vapor and, therefore, drops to the bottom of the dehydrator where it passes through a 100-mesh screen and enters the outlet tube. As the outlet tube is open at the bottom only, liquid refrigerant will flow through it during normal operation. At temperatures above 70° F, the sight glass may indicate whether the refrigerant is sufficient. A shortage of liquid refrigerant is indicated after several minutes of compressor operation by the appearance of slow moving bubbles (vapor) or a broken column of refrigerant under the glass. If the sight glass is generally clear and performance is satisfactory, occasional bubbles do not indicate refrigerant shortage. Restrictions in the dehydrator can also cause system malfunction. If the outlet tube is blocked, suction may be normal or low and there will be little or no cooling. A restriction may cause the refrigerant to vaporize as it leaves the dehydrator, making the outlet excessively cold. In case of malfunction, the dehydrator should be replaced. Do not remove the shipping caps from a new unit until immediately prior to installation.

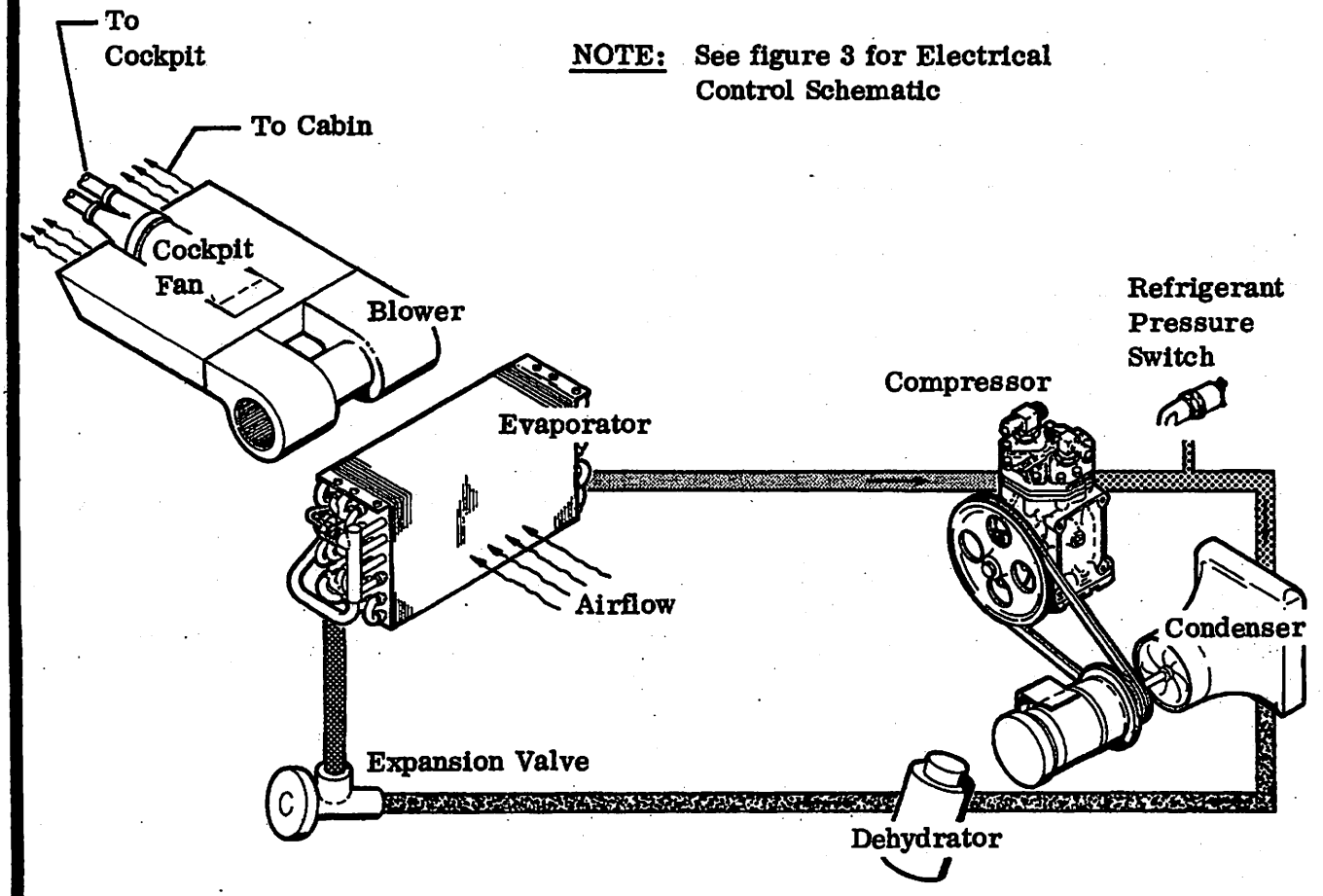
(5) The pressure switch is installed in the compressor discharge system and must be removed and functionally checked in accordance with current inspection requirements specified in Chapter 5.

(6) The evaporator and blower is installed to cool, dry, and clean the air in the cabin section. Refrigerant enters the evaporator as a low-pressure mixture of liquid and vapor. The liquid vaporizes at this low pressure, absorbing large quantities of heat. The heat comes from the air that passes through the evaporator fins, thus cooling the air being recirculated by the blower. As the heat is transferred through the walls of the evaporator from warm air passing over them, moisture in the air condenses and is drained overboard. Dirt or other foreign matter on the core surfaces or in the evaporator case will restrict airflow and decrease cooling efficiency. Assure that the evaporator is kept clean and the condensate drain line is unrestricted. The blower assembly is shock-mounted immediately forward of the evaporator. The blower consists of a single 28 vdc motor with a rotor fan mounted on each end of the motor shaft.

2. Operation (See figures 2 and 3.)

NOTE: The refrigeration system will disengage when the Starter-Generator Switch is set to START.

A. The cooling system is controlled by the COOL/FAN Switch located on the cabin climate control panel. When the COOL/FAN Switch is set to COOL, 28 vdc is applied to the freon control relay through the energized generator relay and the deenergized start cutout relay. A ground circuit to the freon control relay is completed through the refrigerant pressure switch when the pressure in the system is normal. When the freon control relay is energized, 28 vdc power from the freon current limiter (FL3, 150-ampere) is applied to the compressor motor. Under this condition, refrigerant R-12 is being compressed and circulated throughout the system while the evaporator blower is circulating cabin air through the evaporator for cooling. Under high humidity conditions, additional cabin heat may be required to offset operation of the refrigeration system to maintain desired cabin temperature. If cabin air circulation only is desired, the evaporator blower can be operated independently of the compressor by setting the COOL/FAN Switch to FAN. Protection against system overpressurization is provided by a refrigerant pressure switch plumbed to the compressor discharge port. If compressor discharge pressure reaches approximately 335 (±10) psi, the switch contacts open, deenergizing the freon control relay and disengaging the compressor motor. When discharge pressure drops to approximately 205 (±40) psi, the switch contacts close, energizing the freon control relay and engaging the compressor motor. Actuation of the pressure switch does not affect evaporator blower operation. A cockpit blower fan, installed in the forward portion of the evaporator and blower assembly, provides additional cabin and cockpit cooling. (Refer to 21-21-00 for additional information on the cabin and cockpit blower system.)

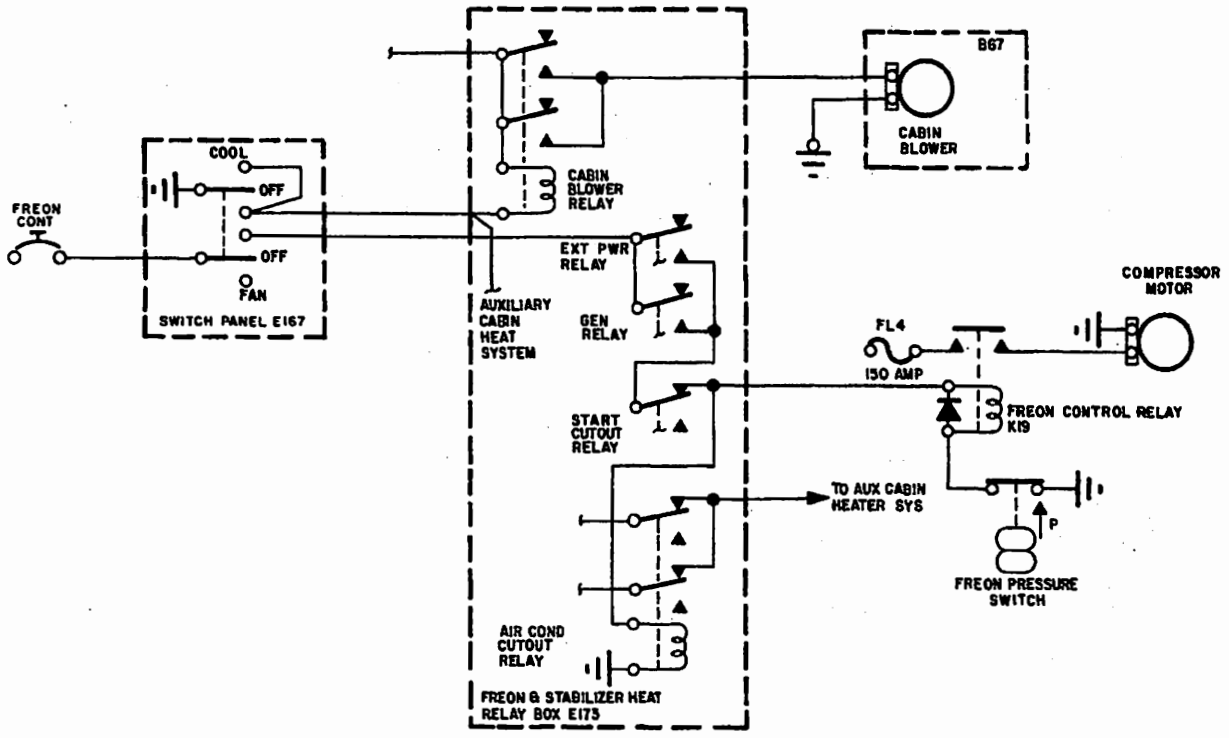


NOTE: See figure 3 for Electrical Control Schematic

LEGEND

Low Pressure Vapor
High Pressure Vapor
High Pressure Liquid
Low Pressure Liquid/Vapor

Typical Refrigeration System Schematic
Figure 2



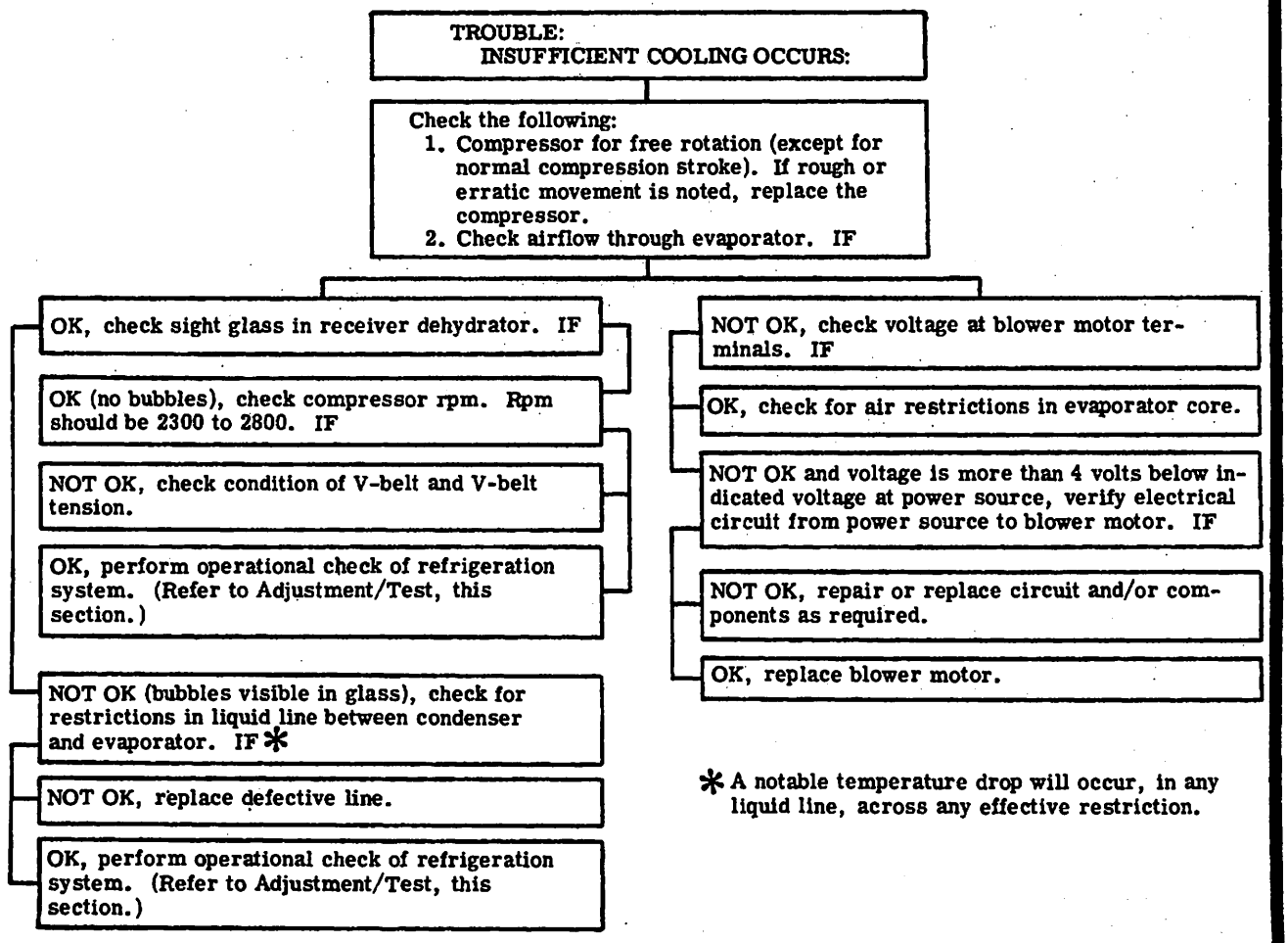
Refrigeration (Freon) System Electrical Control Schematic
Figure 3

COOLING - TROUBLE SHOOTING

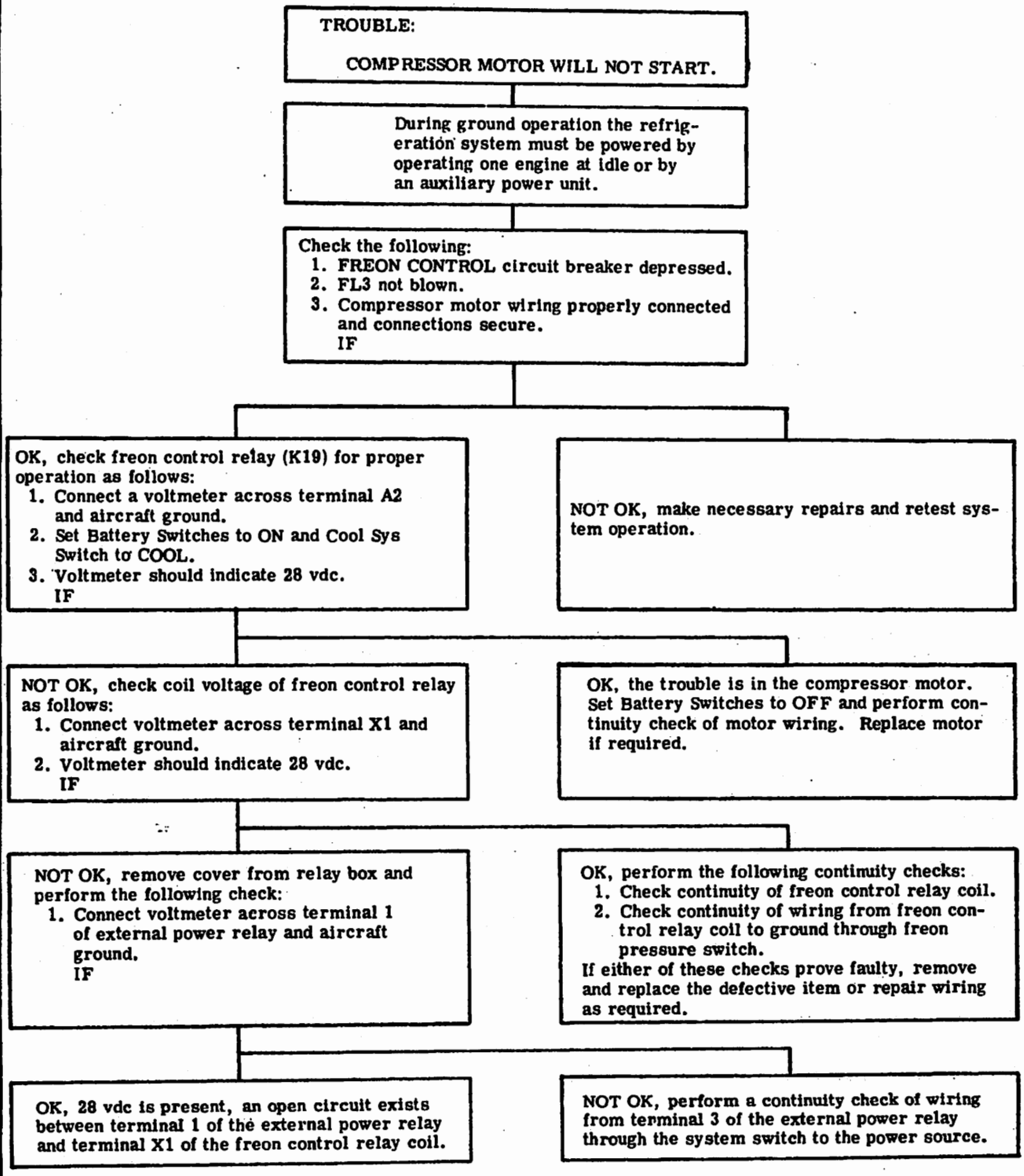
1. Trouble Shooting
   A. See figure 101 for trouble shooting procedures.

2. Tools and Equipment

NAME	PART NUMBER	MANUFACTURER	USE
Voltmeter	3430A	Hewlett Packard	General
or			
Voltmeter	260	Simpson	General



Refrigeration System Trouble Shooting
Figure 101 (Sheet 1 of 2)



Refrigeration System Trouble Shooting
Figure 101 (Sheet 2 of 2)

COOLING - MAINTENANCE PRACTICES

1. Compressor Oil Level

   A. The compressor oil level shall be checked only when adding refrigerant to the system, or after the vapor system has been discharged. On Aircraft 25-061, 25-070 thru 25-342, (equipped with a York compressor) the compressor oil reservoir is factory-filled with 10 fluid ounces (295.7 ml) of refrigeration oil. On Aircraft 25-343 and Subsequent, (equipped with a Sankyo compressor) the compressor oil reservoir is factory-filled with 6 fluid ounces (177.4 ml) of refrigeration oil. Only Texaco Capella D grade refrigerant oil or the equivalent shall be used when adding oil to the compressor. (Refer to Chapter 12.)

2. Inspection/Check

   CAUTION: DO NOT OPERATE REFRIGERATION SYSTEM WITH CONDENSER AIR OUTLET BLOCKED.

   A. Operationally Check Refrigeration System

      NOTE: This operational check must be performed in accordance with current inspection intervals in Chapter 5.

      (1) Connect a 300 to 400 psi gage to compressor (DISCHARGE) and a 150 to 250 psi gage to compressor (SUCTION) service valve connections.
      (2) Connect external power to aircraft.
      (3) Set Battery Switches on, COOL/FAN Switch to COOL and operate cooling system until appropriate discharge and suction pressures to ambient air temperature readings are obtained. (See figure 201.) If appropriate readings are obtained, the cooling system is operating properly. If pressure gage indication is too low, proceed to step (4). If pressure gage indication is too high, proceed to step (6).
      (4) Set COOL/FAN Switch to OFF and observe cooling rate of discharge line and warming rate of suction line.
      (5) If discharge line cools quickly and suction line heats quickly, replace compressor.
      (6) Pull CAB BLO circuit breaker and observe suction pressure. Suction pressure should drop to 5 psig within 5 minutes. If suction pressure does not drop to 5 psig, the expansion valve is defective and should be replaced.
      (7) Reset CAB BLO circuit breaker and allow system pressures to return to normal. (See figure 201.)

(8) Pull FREON CONT circuit breaker and observe rise in suction pressure. Suction pressure should rise rapidly to 45 (+10, -5) psig, then stop or continue to rise at a slower rate. If rate of suction pressure rise has not decreased when pressure exceeds 55 psig, the expansion valve is defective and should be replaced.

(9) Restore system to normal.

B. Check and Adjust V-Belt Tension

(1) Place a straightedge on the V-belt.

(2) Apply a 5- to 6-pound load to V-belt at its midpoint; deflection from straightedge should be 3/16 inch or less.

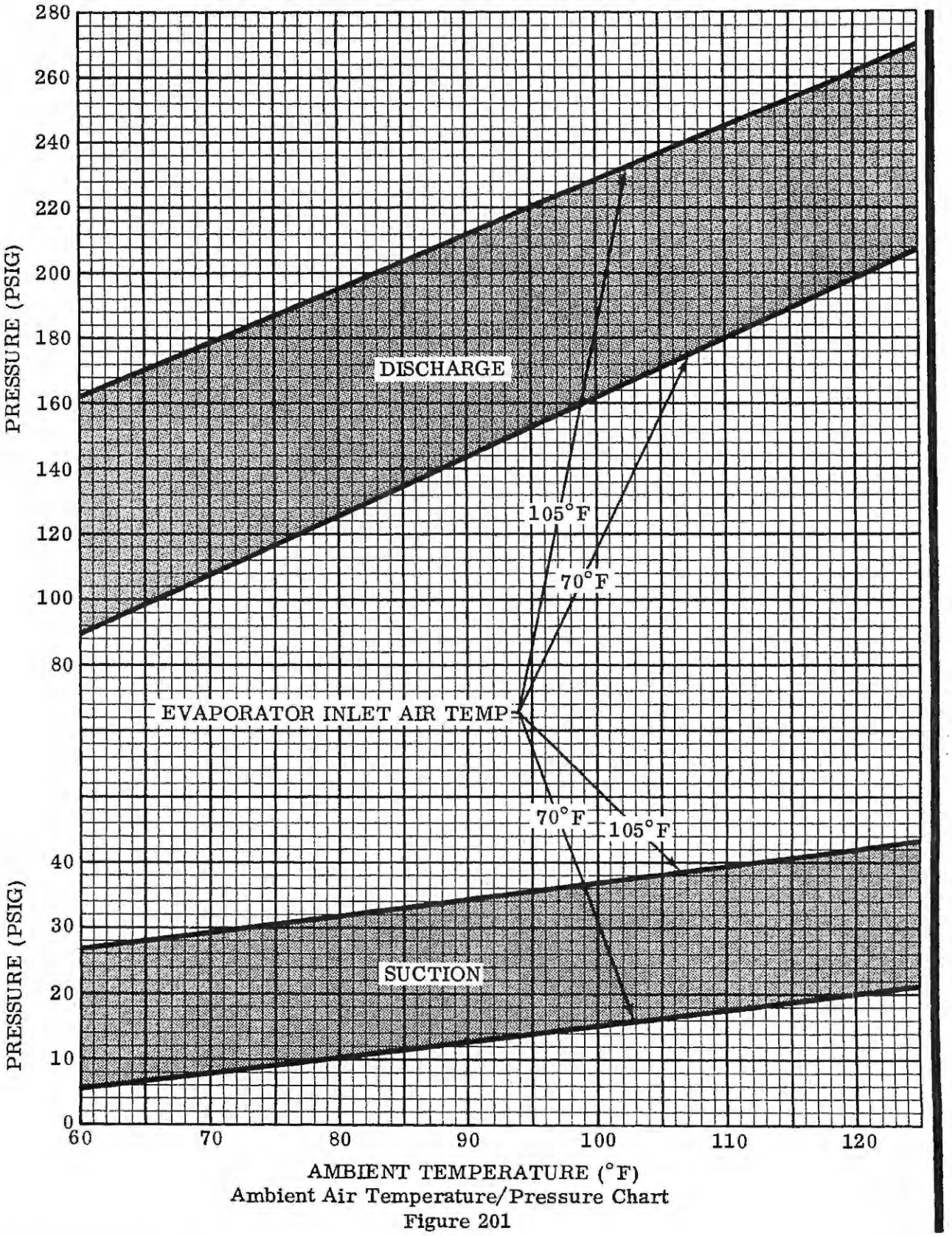
(3) If deflection is more than 3/16 inch, loosen compressor attaching bolts and adjust compressor until desired tension is obtained.

(4) Tighten compressor attaching bolts and check pulley alignment.

(5) Torque compressor attaching bolts to 14 foot-pounds each.

C. Check Pulley Alignment

(1) Pulley alignment may be checked by holding a 1/2-inch rod (2 or 3 feet long) firmly in V-groove of compressor pulley and making sure rod falls squarely in compressor motor pulley grooves. A further check may be made by seeing that the belt, as it goes from pulley to pulley, comes off the pulley grooves perfectly straight and there are no sideway bends in the belt as it approaches or leaves the pulleys. Alignment adjustments are made by loosening compressor motor attaching bolts and adjusting compressor motor forward or aft until pulleys are aligned. Torque compressor motor attachment bolts to 14 foot-pounds each.



Ambient Air Temperature/Pressure Chart
Figure 201

REFRIGERANT COMPRESSOR - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Refrigerant Compressor (See figure 201.)

(1) Lower tailcone access door and disconnect aircraft batteries.

(2) Disconnect electrical wiring from refrigeration system pressure switch.

(3) Discharge refrigeration system. (Refer to Chapter 12.) Disconnect hoses from compressor. Cap all exposed openings.

(4) On Aircraft 25-343 and Subsequent, remove aft shield and belt guard.

(5) Loosen compressor attaching bolts. Slide compressor up and remove belt from compressor pulley.

(6) Remove compressor attaching bolts and compressor from aircraft.

(7) If compressor is to be replaced with a new unit, perform the following:

(a) On Aircraft 25-061, 25-070 thru 25-342, remove adapters from compressor assemblies and discard old seals.

(b) Remove bolt and compressor pulley from compressor assembly.

(c) On Aircraft 25-343 and Subsequent, remove forward shield from compressor assembly.

(d) On Aircraft 25-343 and Subsequent, remove refrigerant pressure switch from discharge service port of compressor.

B. Install Refrigerant Compressor (See figure 201.)

(1) When installing replacement compressor, install the following parts on the compressor assembly:

(a) On Aircraft 25-061, 25-070 thru 25-343, install seal and adapter (one without elbow) in compressor SUCTION port. Torque adapter to 35 foot-pounds with adapter positioned as shown.

NOTE: If elbow if being reinstalled in discharge port adapter, apply No. 48 teflon tape (0.5 inch wide) to elbow threads and torque elbow to position shown.

(b) On Aircraft 25-061, 25-070 thru 25-342, install seal and remaining adapter in compressor DISCHARGE port. Torque adapter to 35 foot-pounds with adapter positioned as shown.

(c) On Aircraft 25-343 and Subsequent, install forward shield.

(d) Install compressor pulley on compressor assembly and torque bolt to 22 foot-pounds.

(e) On Aircraft 25-343 and Subsequent, install refrigerant pressure switch on compressor discharge service port.

(2) Install and secure compressor assembly to mounting panel. Do not torque bolts at this time.

(3) Install V-belt on compressor pulley. Adjust V-belt tension. (Refer to 21-50-00.)

(4) On Aircraft 25-343 and Subsequent, install belt guard and aft shield.

(4) Remove caps from refrigerant lines and connect lines to adapters.
(5) Charge refrigeration system. (Refer to Chapter 12.)
(6) Connect electrical wiring to refrigerant system pressure switch.
(7) Connect aircraft batteries and secure tailcone access door.

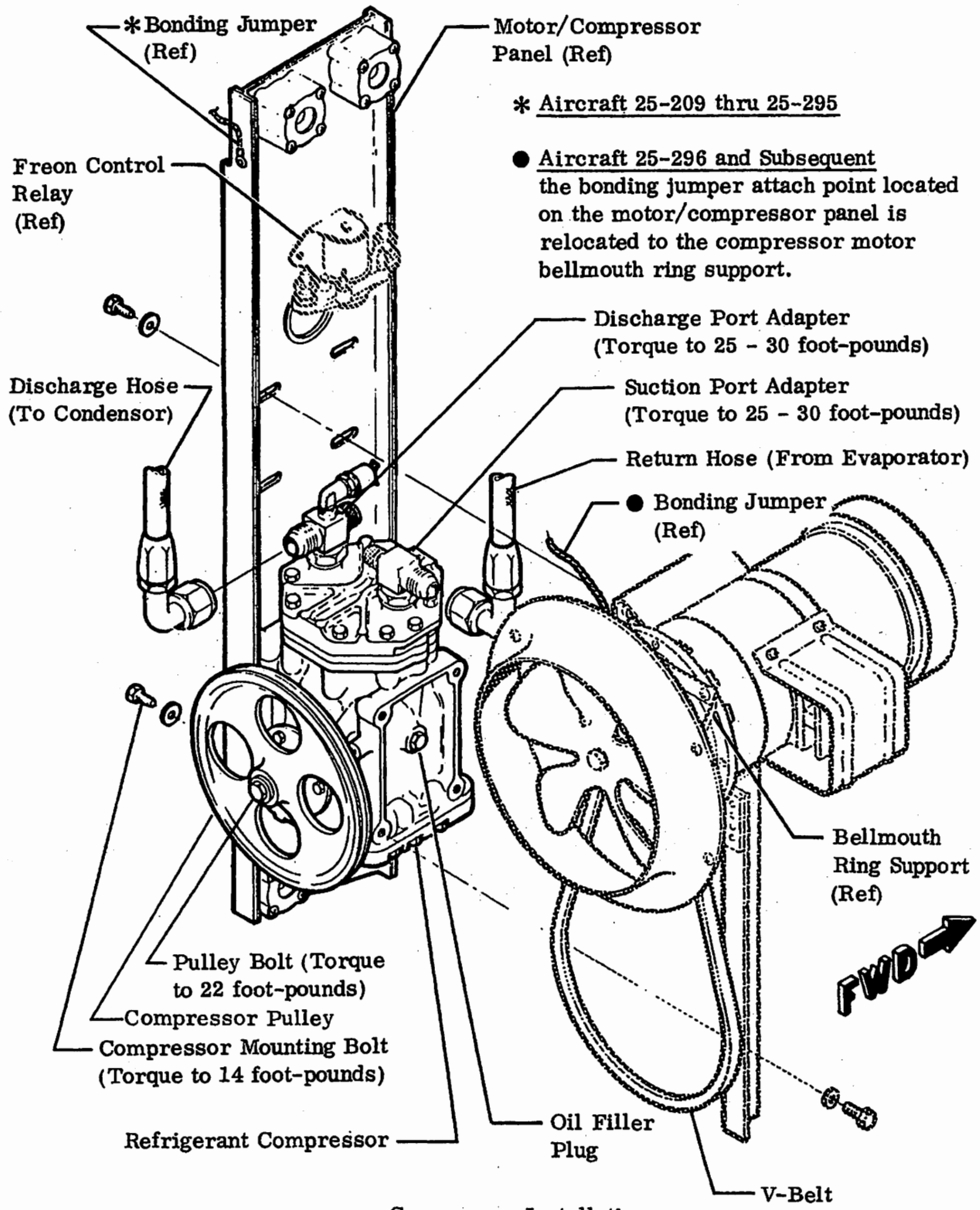
NOTE: A slight oil leakage at the compressor shaft seal could be normal. Do not condemn and replace the compressor until the seal has been given an opportunity to "run in" and until there is definite proof that replacement is necessary. Run the compressor for a minimum of one hour to see if the leak stops before removing for leaking.

2. Inspection/Check

A. Sankyo Compressor Free-Running Torque Check (Aircraft 25-343 and Subsequent.)

NOTE: • Wait a minimum of 30 minutes after refrigeration system shutdown to perform this check so that system pressure will be equalized.
• Check free-running torque at ramp/hangar ambient temperature.

(1) Apply a suitable torque wrench directly to compressor pulley retaining nut. Check torque.
(2) If torque required to turn compressor is 80 inch-pounds or less, internal seizure is not indicated and compressor is acceptable for service.
(3) If torque required to turn compressor exceeds 80 inch-pounds, remove drive belt, bleed off system refrigerant charge and repeat step 2.A.(1).
(4) If torque required to turn compressor is 80 inch-pounds or less, install drive belt and recharge refrigerant. (Refer to Chapter 12.) Compressor is acceptable for service.



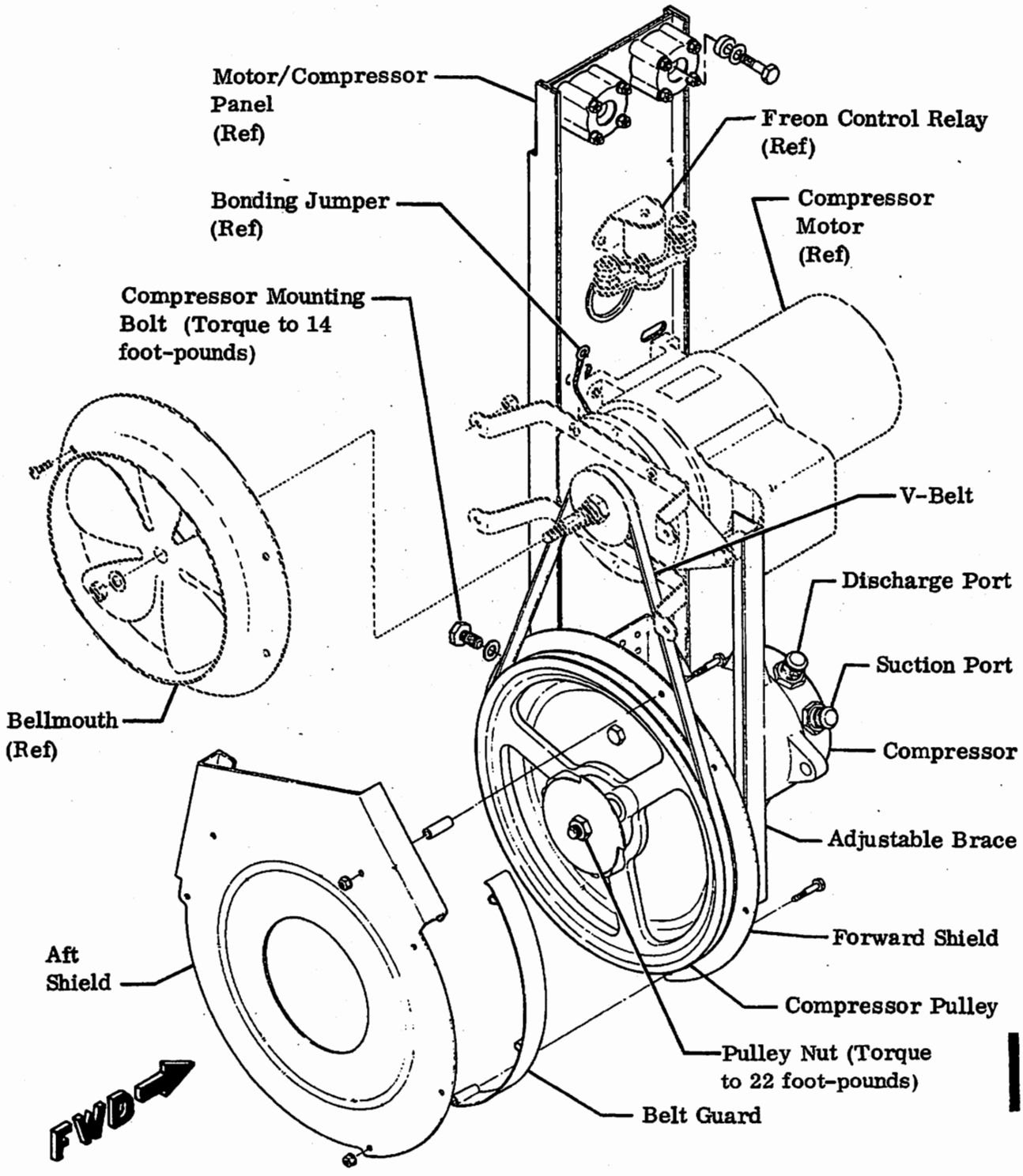
* Aircraft 25-209 thru 25-295

● Aircraft 25-296 and Subsequent the bonding jumper attach point located on the motor/compressor panel is relocated to the compressor motor bellmouth ring support.

Compressor Installation
Figure 201 (Sheet 1 of 2)

13-39C

EFFECTIVITY: 25-061, 25-070 THRU 25-342



Compressor Installation
Figure 201 (Sheet 2 of 2)

13-39C-7

COMPRESSOR MOTOR - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Compressor Motor (See figure 201.)

(1) Open tailcone access door and disconnect aircraft batteries.

CAUTION: WHEN NECESSARY TO DISCONNECT AN ELECTRICAL BONDING JUMPER, ENSURE THAT IT IS CORRECTLY REINSTALLED. ELECTRICAL BONDING INTEGRITY IS ESSENTIAL TO THE PROPER OPERATION AND SAFETY OF AIRCRAFT ELECTRICAL AND AVIONIC EQUIPMENT.

(2) Remove terminal cover and disconnect and tag compressor motor wiring.

(3) On Aircraft 25-296 and Subsequent, disconnect electrical bonding jumper from compressor motor housing.

(4) On Aircraft 25-343 and Subsequent, remove aft shield and belt guard from compressor assembly.

(5) Loosen compressor mounting bolts sufficiently to allow compressor to be pushed upward. Remove V-belt from compressor pulley.

(6) Loosen and remove bellmouth support screws from bellmouth supports and bellmouth.

(7) Remove compressor motor mounting bolts and compressor motor from aircraft.

(8) If replacement compressor motor is to be installed, remove screws and bellmouth supports from compressor motor housing. Remove fan bolt, loosen setscrews, and remove fan from compressor motor shaft.

B. Install Compressor Motor (See figure 201.)

(1) If installing a replacement compressor motor, secure bellmouth supports to compressor motor housing. Install fan and fan bolt or nut. Torque fan bolt or nut 160 to 190 inch-pounds. Apply locking compound (Loctite No. 242, NutLock, CV or equivalent) to setscrews and tighten.

(2) Install compressor motor on mounting panel and secure with bolts. Do not torque bolts at this time.

(3) Position V-belt on compressor pulley.

(4) Adjust V-belt tension. (Refer to 21-50-00.)

(5) Tighten compressor attaching bolts and check pulley alignment. (Refer to 21-50-00.)

(6) Torque compressor attaching bolts to 14 foot-pounds.

(7) On Aircraft 25-343 and Subsequent, install belt guard and aft shield on compressor assembly.

(8) Secure bellmouth supports.

(9) Secure electrical bonding jumper to compressor motor.

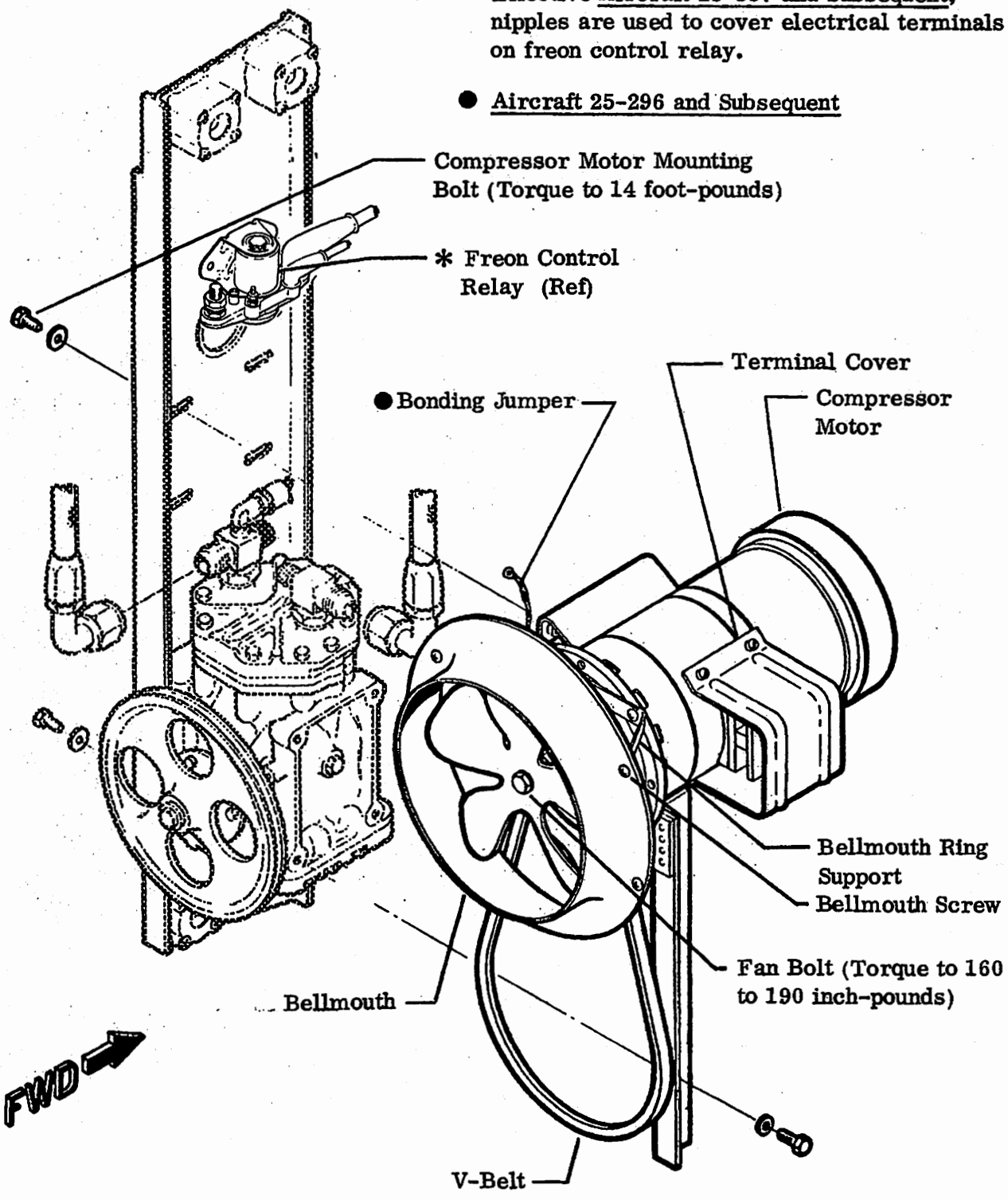
(10) Remove tags and connect electrical wiring to compressor motor.

(11) Install terminal cover.

(12) Connect aircraft batteries and secure tailcone access door.

* Effective Aircraft 25-357 and Subsequent, nipples are used to cover electrical terminals on freon control relay.

● Aircraft 25-296 and Subsequent



Typical Compressor Motor Installation
Figure 201

2. Inspection/Check

NOTE: The following inspection must be performed in accordance with the current inspection interval specified in Chapter 5.

A. Check Compressor Motor Brush Length (Aircraft equipped with Electro Mech Motor) (See figure 202.)
   (1) Open tailcone access door and remove power from aircraft.
   (2) Remove attaching parts and cover can from aft end of compressor motor.
   (3) Disconnect brush lead from motor.

   CAUTION: WHEN REMOVING BRUSHES FROM MOTOR, USE EXTREME CAUTION NOT TO DAMAGE BRUSHES. SIDE PRESSURE MAY CRACK, CHIP, OR BREAK BRUSHES.

   (4) Disengage spring tension and pull brushes out of motor.
   (5) Measure brush length. If brush length is 0.75 inch or less, not including the resilient cap, or if any of the contact edges are chipped, pitted, or broken, the brushes shall be replaced.
   (6) Inspect commutator for damage. If commutator is pitted, scored, or badly worn, the motor must be replaced.

   CAUTION: WHEN INSTALLING BRUSHES, ENSURE THAT BRUSH LEADS ARE FORMED SO THEY CAN FLEX WITH BRUSH WEAR AND HAVE NO CHANCE OF COMING IN CONTACT WITH THE CASE, END BELL, OR COVER CAN.

   (7) Install brushes in motor.
   (8) Brushes must be run in, under a no load condition, until a minimum of 75% of brush face is in contact with commutator.
   (9) Clean brush dust from motor using compressed air.
   (10) Install cover can and secure with attaching parts.
   (11) Perform Refrigeration System Operational Check.

B. Check Compressor Motor Brush Length (Aircraft equipped with G.E. motor) (See figure 202.)
   (1) Open tailcone access door and remove power from aircraft.
   (2) Remove attaching parts, brush cover, and spring (four places) from compressor motor.
   (3) Disconnect brush lead from motor.

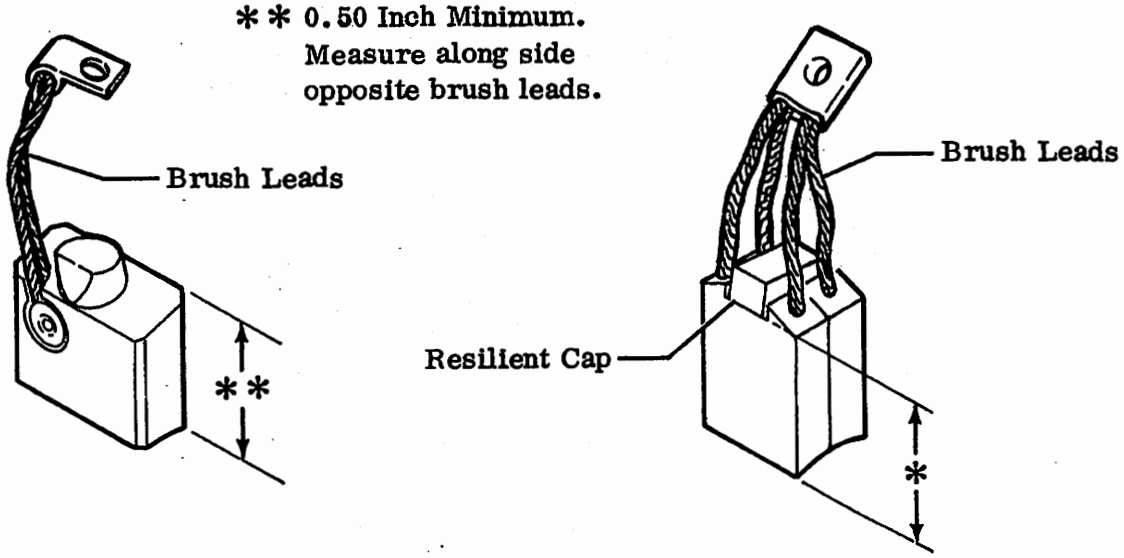
   CAUTION: WHEN REMOVING BRUSHES FROM MOTOR, USE EXTREME CAUTION NOT TO DAMAGE BRUSHES. SIDE PRESSURE MAY CRACK, CHIP, OR BREAK BRUSHES.

(4) Remove brushes from motor.
(5) Measure brush length. If brush length is 0.50 inch or less or if any of the contact edges are chipped, pitted, or broken, the brush shall be replaced.
(6) Inspect commutator for damage. If commutator is pitted, scored, or badly worn, the motor must be replaced.

CAUTION: WHEN INSTALLING BRUSHES, ENSURE THAT BRUSH LEADS ARE FORMED SO THAT THEY CAN FLEX WITH BRUSH WEAR AND HAVE NO CHANCE OF COMING IN CONTACT WITH THE MOTOR CASE.

(7) Install brushes in motor.
(8) Brushes must be run in, under a no load condition, until a minimum of 75% of brush face is in contact with commutator.
(9) Clean brush dust from motor using compressed air.
(10) Perform Refrigeration System Operational Check.

* 0.75 Inch Minimum.
DO NOT include resilient cap in measurement.
** 0.50 Inch Minimum.
Measure along side opposite brush leads.



BRUSH SET (G.E. Motor) BRUSH SET (Electro Mech)

Brush Measurement
Figure 202

13-158A

CONDENSER - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Condenser (See figure 201.)

(1) Lower tailcone access door and disconnect aircraft batteries.

(2) Discharge refrigeration system. (Refer to Chapter 12.)

(3) Remove compressor motor. (Refer to 21-50-02.)

(4) Disconnect compressor discharge hose and dehydrator tube from condenser. Cap all exposed openings.

(5) Remove attaching parts and condenser from aircraft.

B. Install Condenser (See figure 201.)

(1) Install condenser and secure with attaching parts.

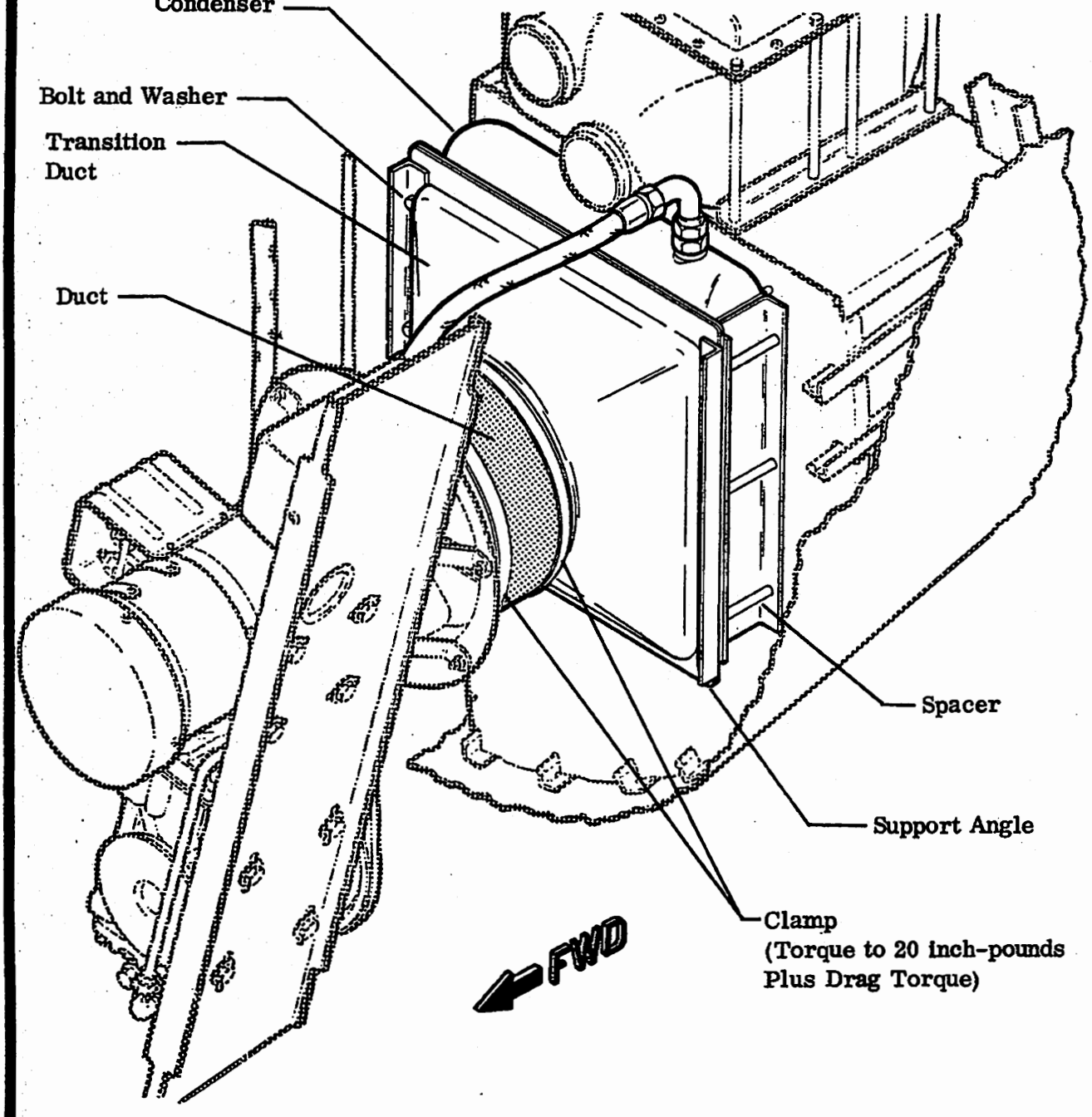
(2) Remove caps and connect compressor discharge hose and dehydrator tube to condenser.

(3) Install compressor motor. (Refer to 21-50-02.)

(4) Charge refrigeration system. (Refer to Chapter 12.)

(5) Connect aircraft batteries and secure tailcone access door.

NOTE: Drag torque is the amount of torque required to overcome the friction of the self-locking nuts.



Condenser Installation
Figure 201

13-38D-1

DEHYDRATOR - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Dehydrator (See figure 201.)

(1) Lower tailcone access door and disconnect aircraft batteries.

(2) Discharge refrigeration system. (Refer to Chapter 12.)

(3) Disconnect and cap dehydrator refrigeration lines.

(4) Remove attaching parts and dehydrator from aircraft.

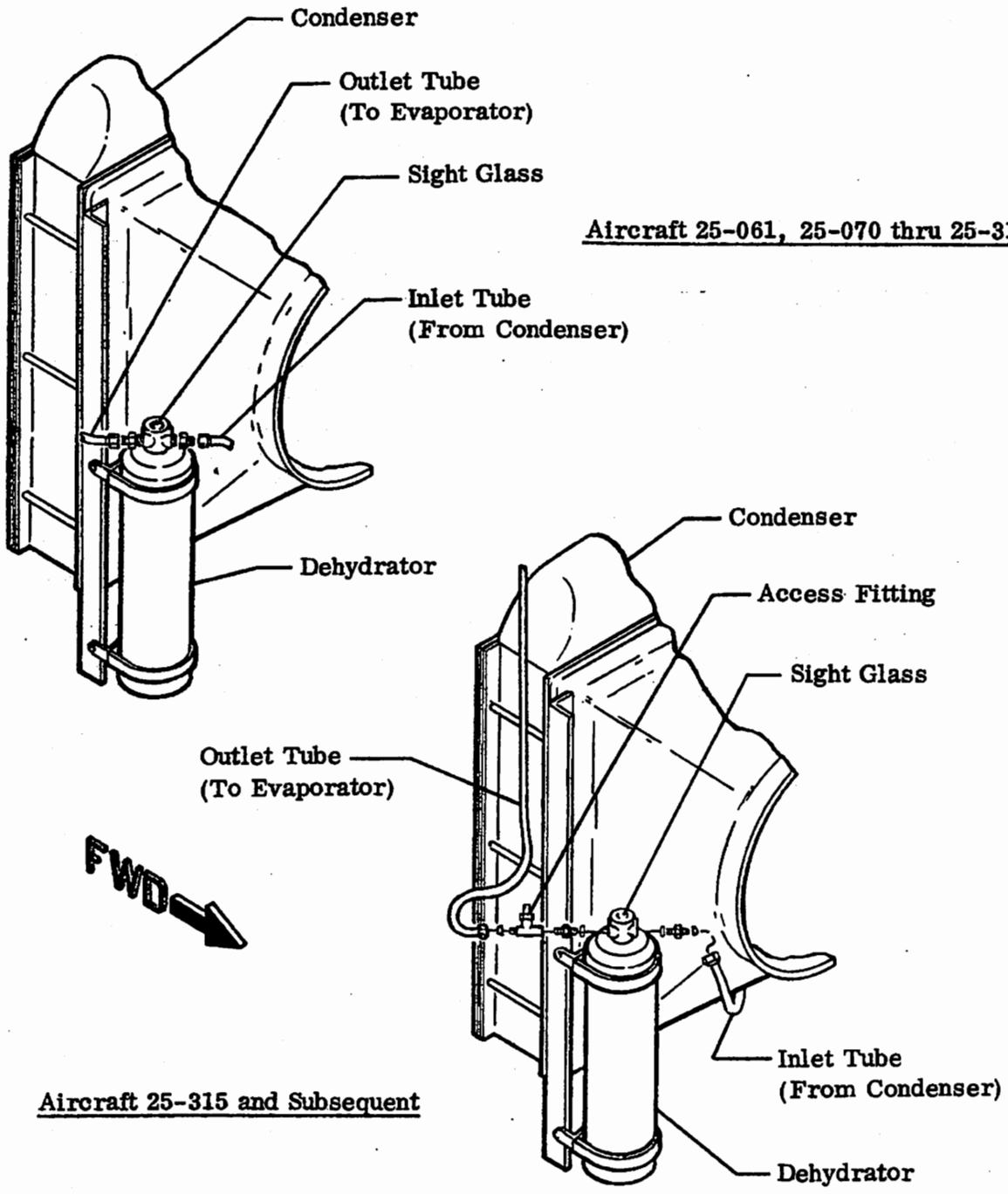
B. Install Dehydrator (See figure 201.)

(1) Install and secure dehydrator.

(2) Install new gaskets and connect lines to dehydrator.

(3) Charge refrigeration system. (Refer to Chapter 12.)

(4) Connect aircraft batteries and secure tailcone access door.



Dehydrator Installation
Figure 201

13-59A

REFRIGERANT PRESSURE SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE: The refrigerant pressure switch is installed in the compressor discharge system. The switch must be removed and functionally checked in accordance with current inspection requirements specified in Chapter 5.

A. Remove Refrigerant Pressure Switch (Aircraft 25-061, 25-070 thru 25-314) (See figure 201.)
   (1) Discharge refrigeration system. (Refer to Chapter 12.)
   (2) Disconnect electrical wiring or electrical connector from refrigerant pressure switch.
   (3) Remove switch from elbow on discharge port adapter or from beneath compressor.

B. Install Refrigerant Pressure Switch (Aircraft 25-061, 25-070 thru 25-314) (See figure 201.)

   NOTE: On aircraft equipped with refrigerant pressure switch installed beneath compressor, place a few drops of refrigerant oil in tube.

   (1) Install refrigerant pressure switch on elbow or beneath compressor.
   (2) Connect electrical wiring or electrical connector.
   (3) Recharge refrigeration system. (Refer to Chapter 12.)

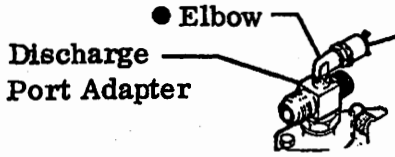
C. Remove Refrigerant Pressure Switch (Aircraft 25-315 and Subsequent) (See figure 201.)
   (1) Disconnect electrical wiring from refrigerant pressure switch.
   (2) Loosen and remove switch from service port.

      NOTE: As refrigerant pressure switch is removed, a valve core incorporated in the service port will close, preventing any escape of the refrigeration system charge.

D. Install Refrigerant Pressure Switch (Aircraft 25-315 and Subsequent) (See figure 201.)
   (1) Install refrigerant pressure switch on service port and tighten.
   (2) Connect electrical wiring to switch.

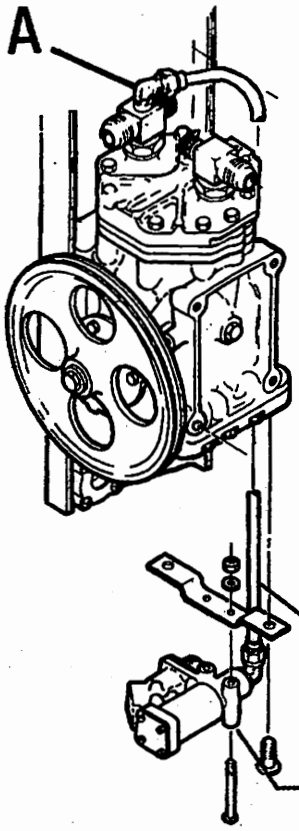
* When replacing refrigerant pressure switch on Aircraft 25-061, 25-070 thru 25-093, the new switch and elbow will be installed directly in the discharge port adapter as shown in Detail A.

● When elbow is removed from discharge port adapter and reinstalled, apply No. 48 teflon tape (0.5 inch wide) to elbow threads and torque elbow to position shown.

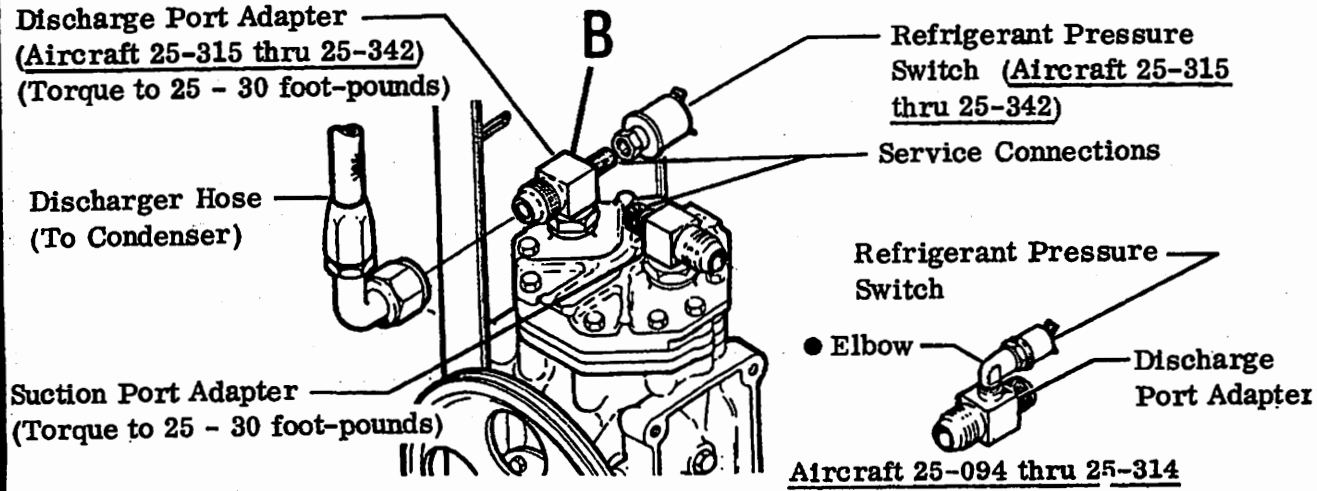


REPLACEMENT SWITCH CONFIGURATION

Detail A



Aircraft 25-061 And 25-070 Thru 25-093



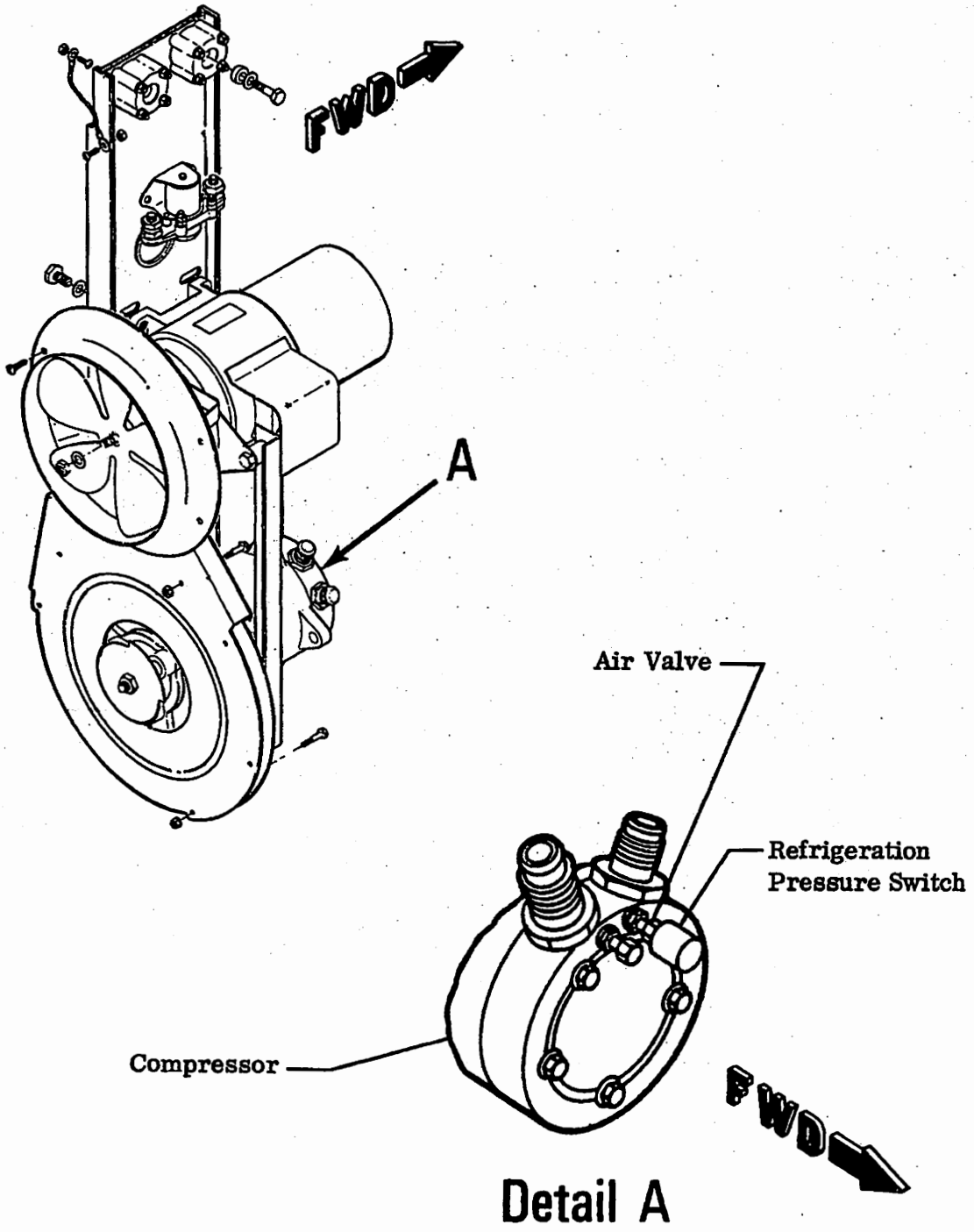
Aircraft 25-094 thru 25-314

Detail B

Aircraft 25-094 thru 25-342

Pressure Switch Installation
Figure 201 (Sheet 1 of 2)

13-39C
13-39A



Pressure Switch Installation
Figure 201 (Sheet 2 of 2)

13-39C-7
A13-81C-4

2. Adjustment/Test

A. Functionally Test Refrigerant Pressure Switch

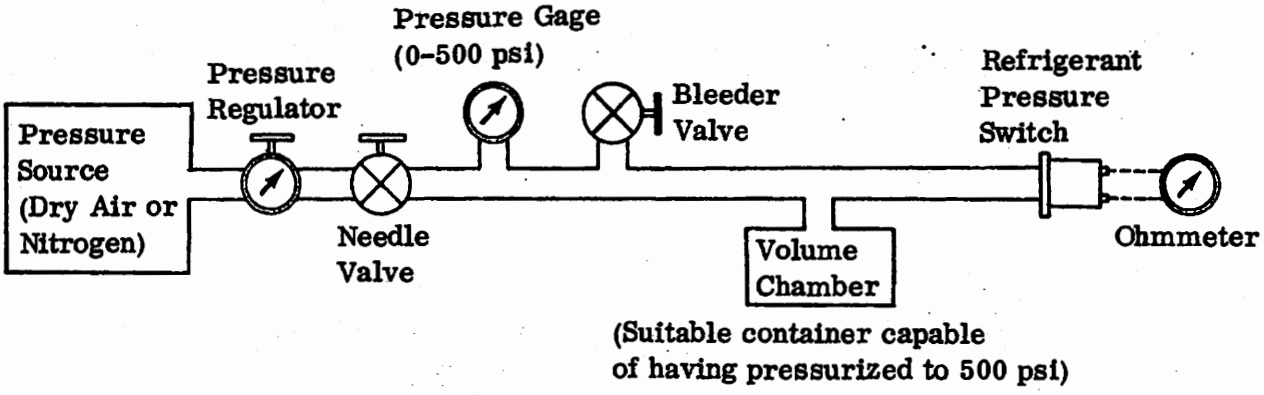
(1) Remove refrigerant pressure switch.

(2) Connect switch to test equipment as shown in figure 202.

(3) Connect ohmmeter to contacts of switch and slowly apply pressure. Switch contacts should open at 335 (±10) psi.

(4) Slowly release pressure; contacts should close at 205 (±40) psi.

(5) Remove switch from test equipment and install in aircraft.



Pressure Switch Functional Test
Figure 202

EVAPORATOR AND BLOWER - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Evaporator and Blower (See figure 201.) (25C/F Aircraft)

(1) Remove upholstery as required to gain access to evaporator and blower installation.

(2) Loosen clamp and disconnect drain tube from evaporator and blower assembly.

(3) Disconnect electrical connector from evaporator and blower assembly. If auxiliary cabin heater is installed, disconnect electrical connector from connector bracket assembly.

(4) Loosen clamps and disconnect ducts from forward cockpit cooling fan transition.

(5) Disconnect refrigeration quick-disconnects.

(6) Support evaporator and blower assembly and remove screws from support brackets. Remove evaporator and blower assembly from aircraft.

(7) If removing blower assembly, proceed with steps (8) and (9). If removing evaporator, proceed with step (10).

(8) Remove screws and cover from evaporator and blower assembly.

(9) Remove screws securing shock mount assembly to cover. Remove blower assembly with shock mount assembly attached.

(10) Remove attaching parts and evaporator from aircraft.

B. Install Evaporator and Blower (See figure 201.) (25C/F Aircraft)

(1) Install evaporator and secure with screws.

(2) Install blower assembly and secure with screws.

(3) Install cover on evaporator and blower assembly and secure with attaching parts.

(4) Install evaporator and blower assembly and secure with screws.

(5) Connect refrigeration quick-disconnects.

(6) Connect ducts to forward cockpit cooling fan transition and secure with clamps.

(7) Connect electrical connector to evaporator and blower assembly. If auxiliary cabin heater is installed, connect electrical connector to connector bracket assembly.

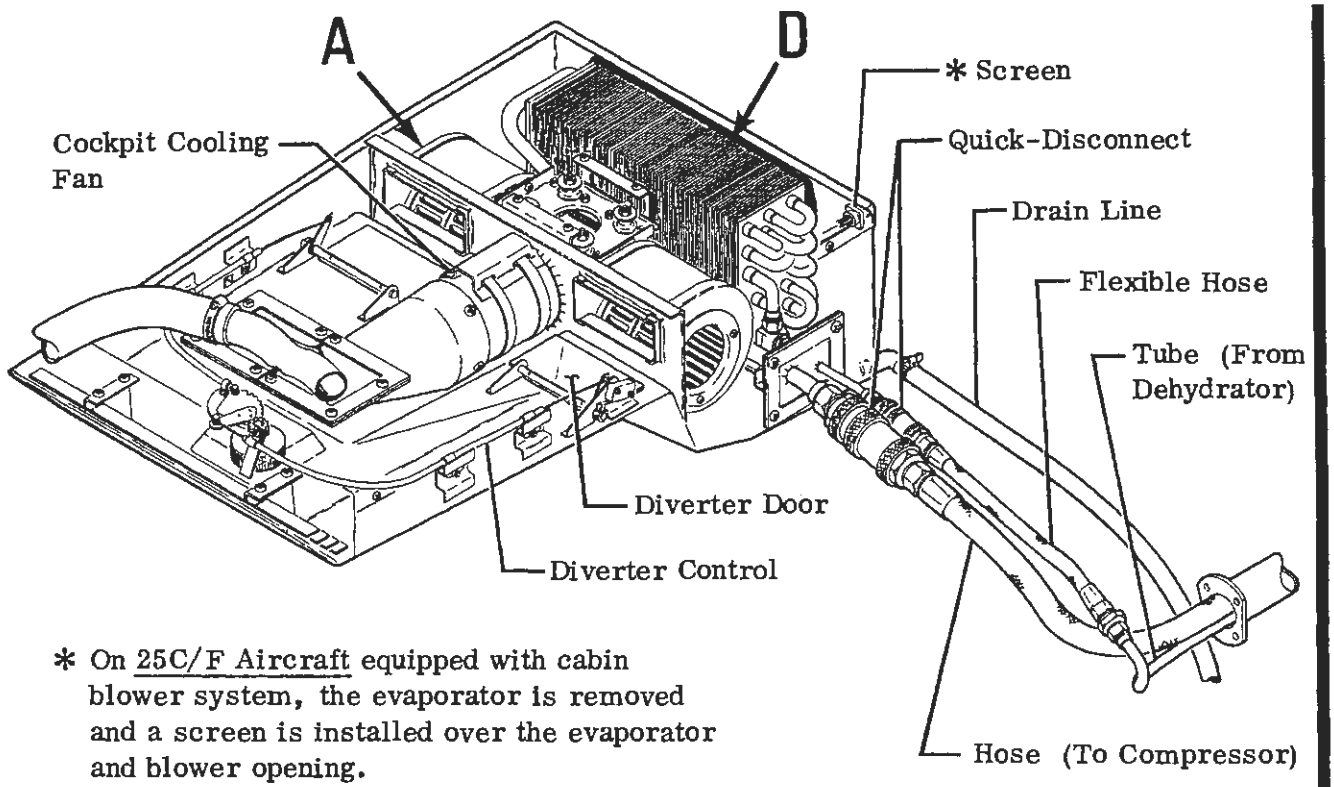
(8) Connect drain tube to evaporator and blower assembly and secure with clamps.

(9) Install upholstery.

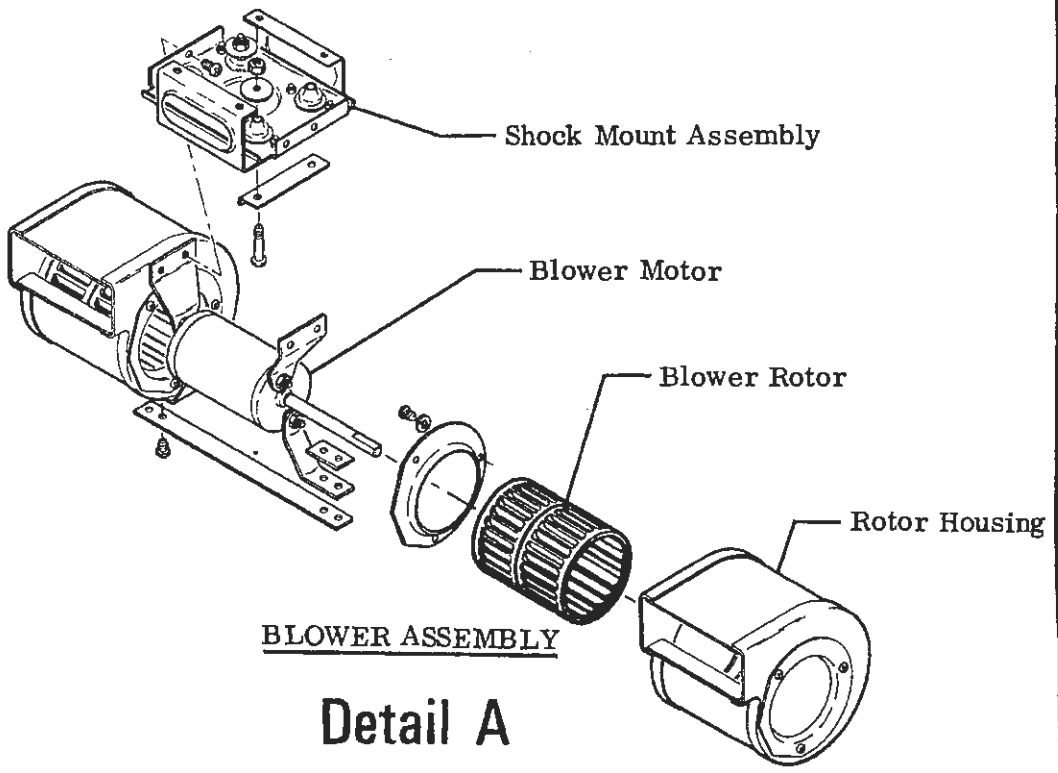
C. Remove Evaporator (See figure 201.) (25B/D Aircraft)
   (1) Remove equipment and upholstery as required to gain access to evaporator and blower installation above baggage compartment.
   (2) Lower tailcone access door and disconnect aircraft batteries.
   (3) Discharge refrigeration system. (Refer to Chapter 12.)
   (4) Disconnect and cap evaporator refrigeration lines.
   (5) Loosen clamp and disconnect evaporator drain line.
   (6) Disconnect blower motor electrical connector.
   (7) Remove screws attaching evaporator duct to evaporator and blower assembly.
   (8) Remove attaching parts and evaporator and blower assembly from the aircraft.
   (9) Remove plungers, grommets and evaporator and blower cover.
   (10) Remove screws and evaporator from evaporator and blower assembly.

D. Install Evaporator (See figure 201.) (25B/D Aircraft)
   (1) Install evaporator in evaporator and blower assembly and secure with screws.
   (2) Install evaporator and blower cover and secure with plungers and grommets.
   (3) Install evaporator and blower assembly and secure with attaching parts.
   (4) Connect evaporator drain line and secure with clamp.
   (5) Secure evaporator duct to evaporator and blower assembly with attaching parts.
   (6) Remove caps and connect refrigeration lines. Connect electrical wiring.
   (7) Charge refrigeration system. (Refer to Chapter 12.)
   (8) Connect aircraft batteries and secure tailcone access door.
   (9) Install upholstery and equipment previously removed.

E. Remove Blower (See figure 201.) (25B/D Aircraft)
   (1) Remove equipment and upholstery as required to gain access to evaporator and blower installation.
   (2) Lower tailcone access door and disconnect aircraft batteries.
   (3) Loosen clamp and disconnect evaporator drain line.
   (4) Remove plungers, grommets, and evaporator and blower cover from evaporator.
   (5) Disconnect blower assembly electrical wiring.
   (6) Remove screws (four places) and blower assembly from aircraft.



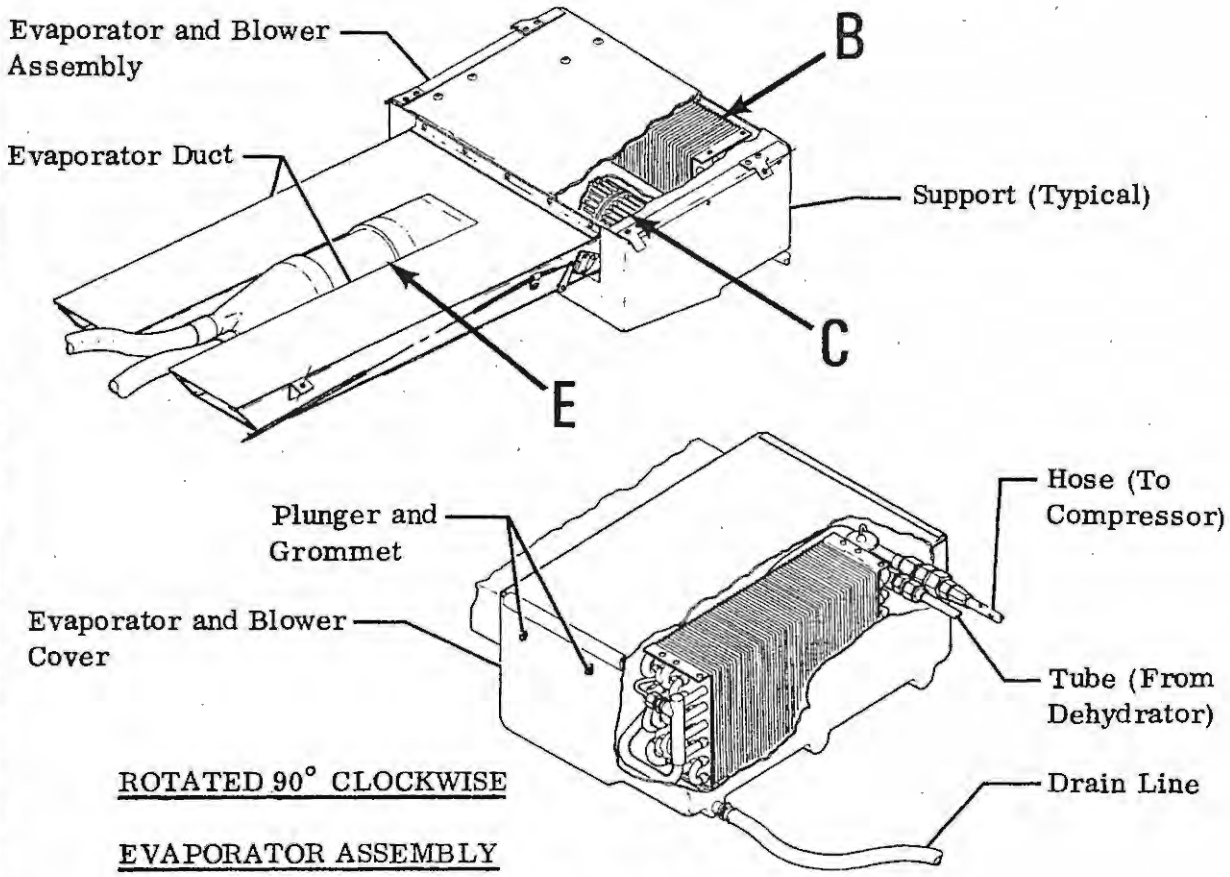
* On 25C/F Aircraft equipped with cabin blower system, the evaporator is removed and a screen is installed over the evaporator and blower opening.



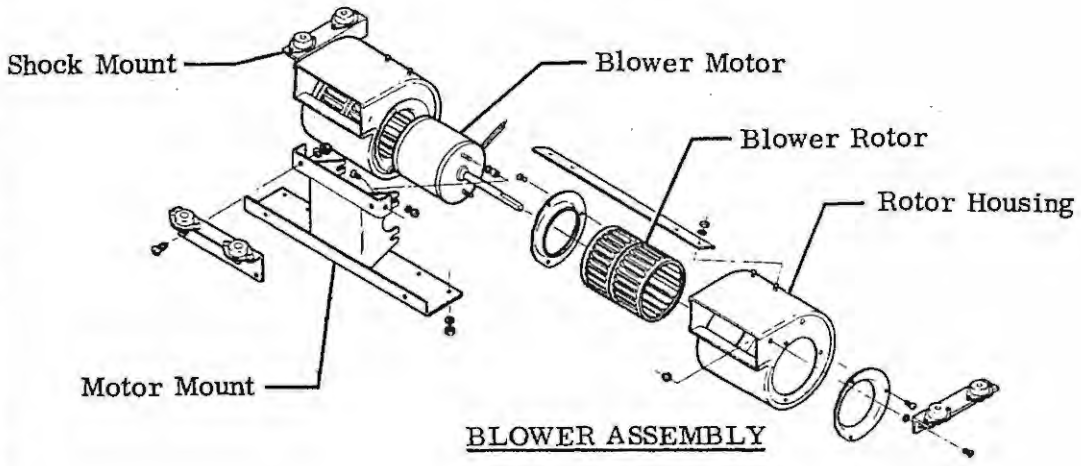
Detail A

Evaporator and Blower Installation
Figure 201 (Sheet 1 of 3)

13-41D-4
A13-41C-3



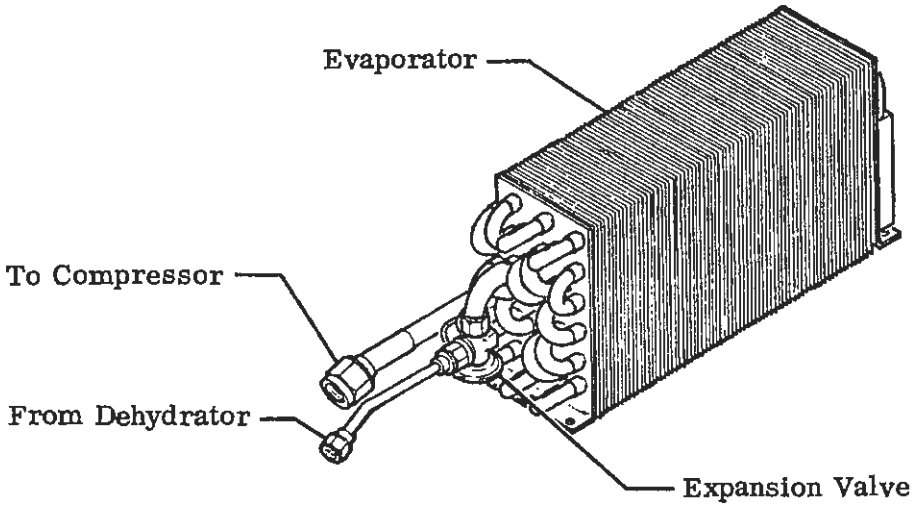
Detail B



Detail C

13-51C
B13-53C
C13-41C-1

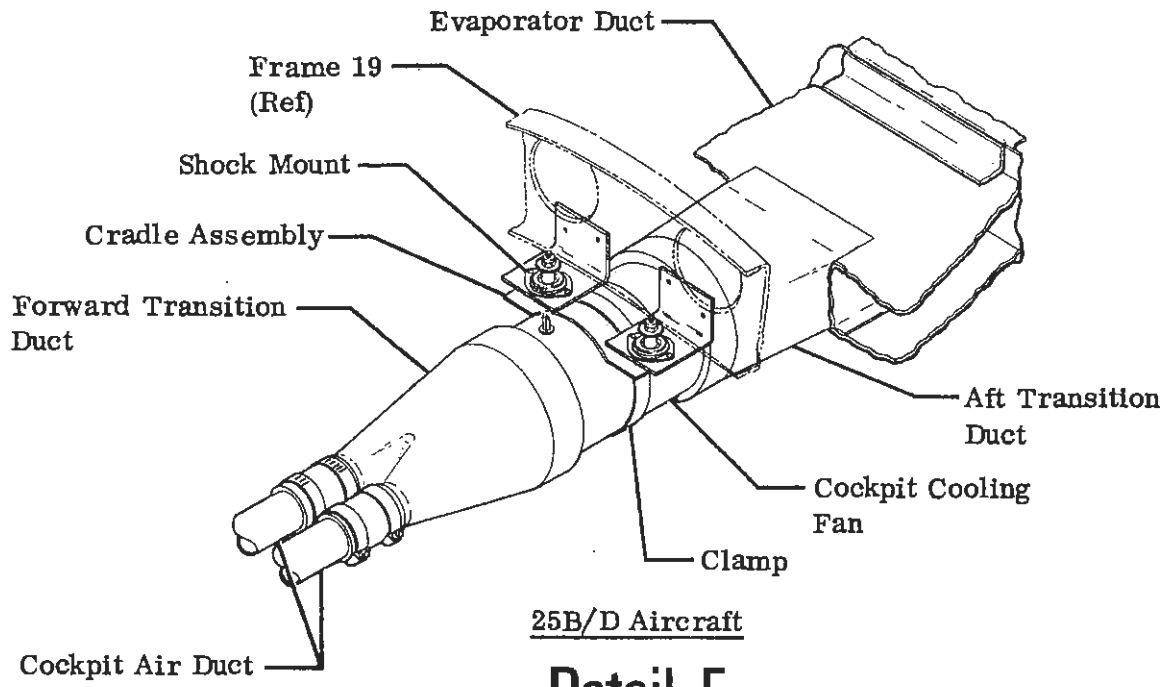
Evaporator and Blower Installation
Figure 201 (Sheet 2 of 3)



ROTATED 90° CLOCKWISE

25C/F Aircraft Equipped with Refrigeration System

Detail D



25B/D Aircraft

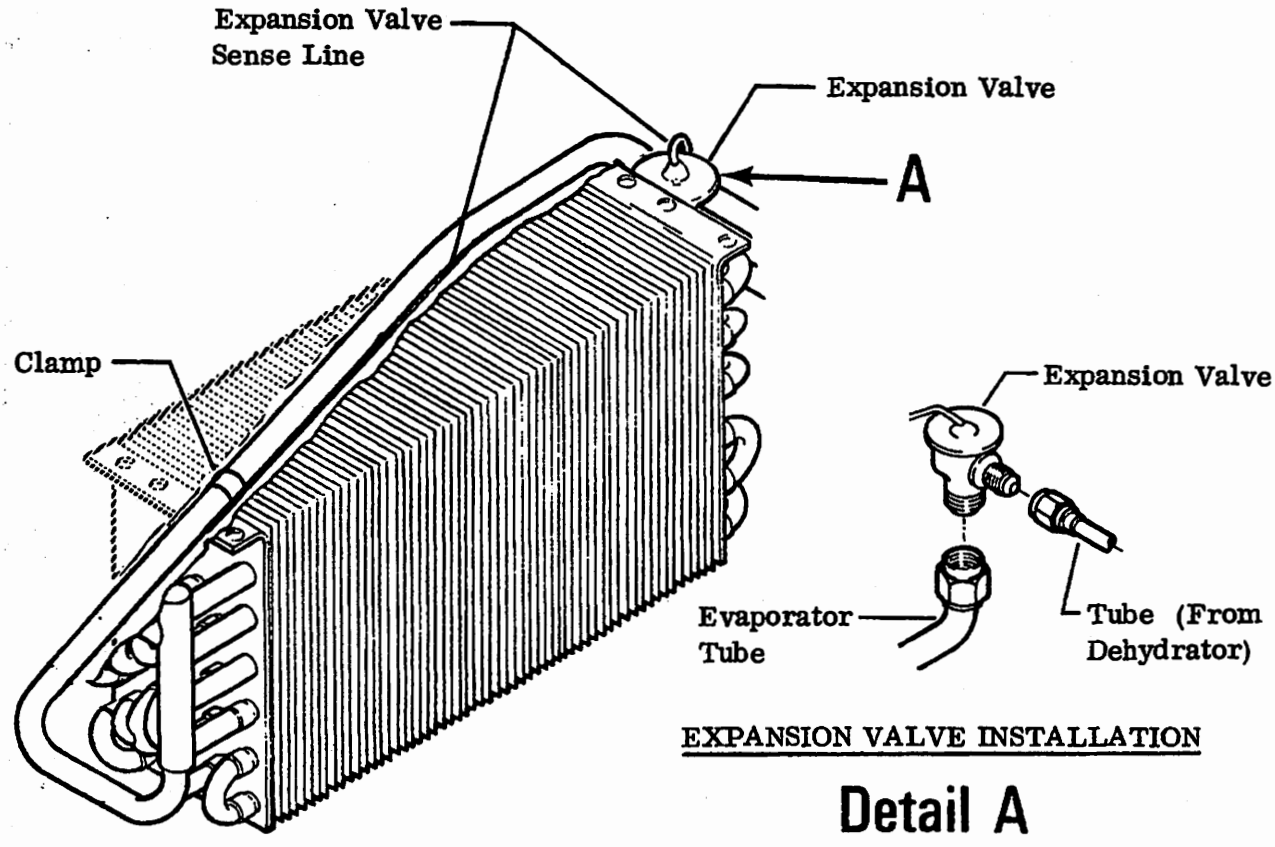
Detail E

Evaporator and Blower Installation
Figure 201 (Sheet 3 of 3)

F. Install Blower (See figure 201.) (25B/D Aircraft)
   (1) Install blower assembly and secure with screws.
   (2) Connect blower assembly electrical wiring.
   (3) Install evaporator and blower cover and secure with plungers and grommets.
   (4) Connect evaporator drain line and secure with clamp.
   (5) Connect aircraft batteries and secure tailcone access door.
   (6) Install previously removed upholstery and equipment.

G. Remove Expansion Valve (See figure 202.)
   (1) Remove evaporator and blower assembly. (Refer to applicable removal procedure.)
   (2) Remove clamp securing expansion valve sense line.
   (3) Loosen fittings and remove expansion valve. Cap exposed fittings.
   (4) Discard old fitting seal.

H. Install Expansion Valve (See figure 202.)
   (1) Install new fitting seal and secure expansion valve.
   (2) Secure expansion valve sense line with clamp.
   (3) Install evaporator and blower. (Refer to applicable evaporator and blower installation.)

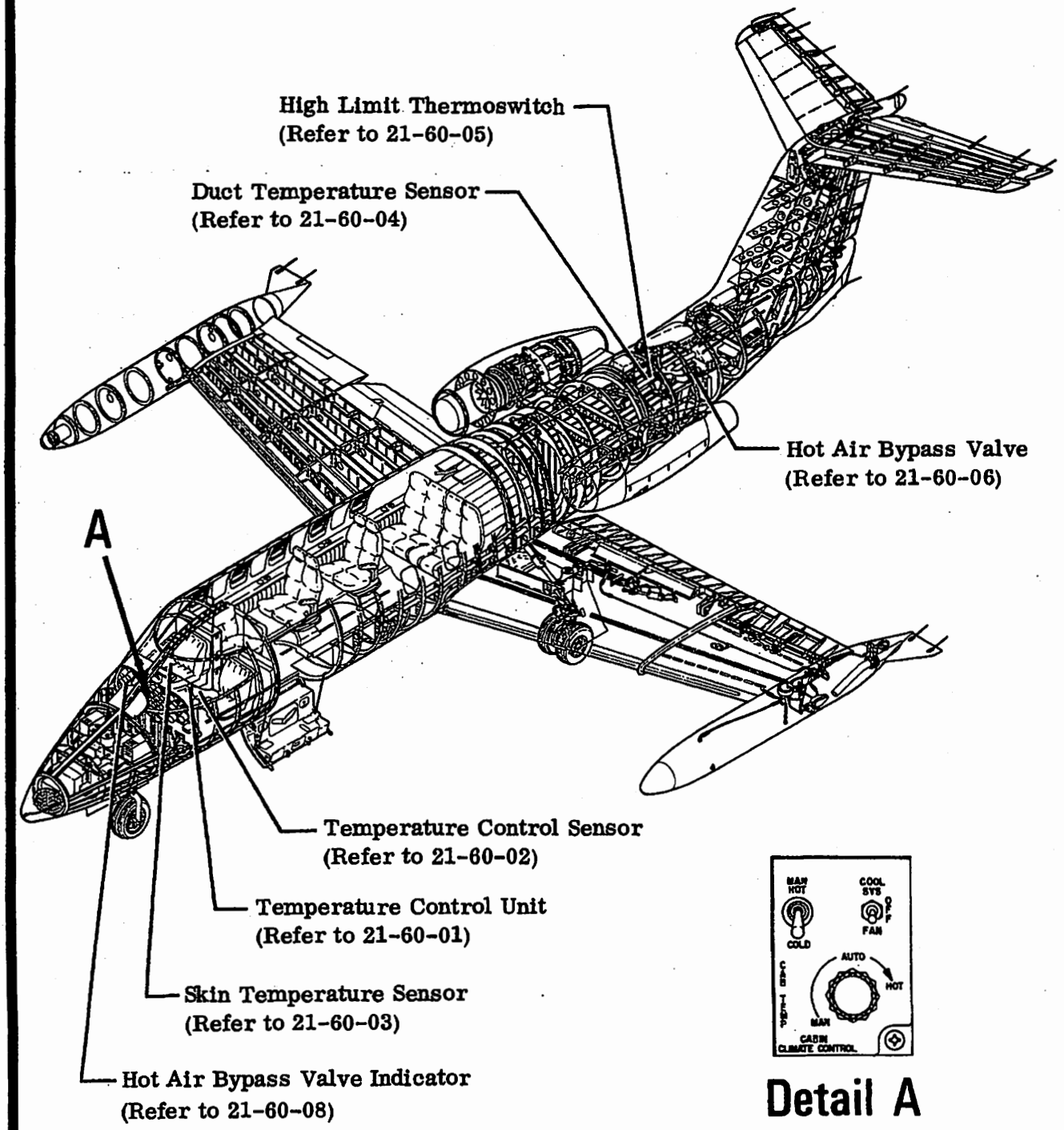


Typical Expansion Valve Installation
Figure 202

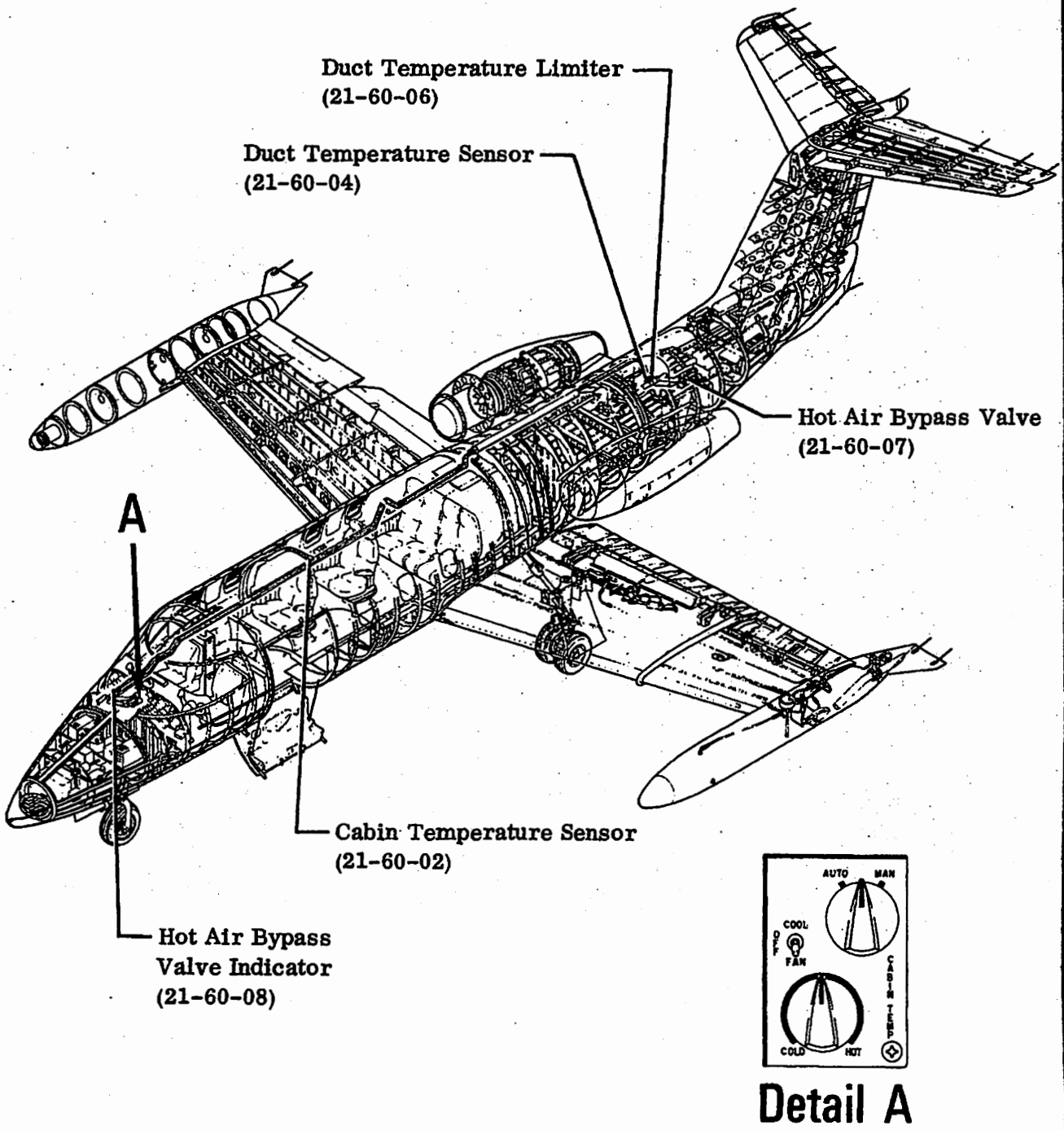
13-53C

TEMPERATURE CONTROLS - DESCRIPTION AND OPERATION

1. Description (See figure 1.)
   A. On Aircraft 25-061, 25-070 thru 25-226, the temperature control system consists of a MAN-AUTO-HOT Temperature Selector, a temperature control unit, a cabin temperature sensor; a high limit thermostat, a MAN-HOT-COLD Switch, a duct temperature sensor, a hot air bypass valve, and a hot air bypass valve indicator. In addition, on Aircraft 25-090 and 25-095 and Subsequent, a cabin skin temperature sensor is incorporated. The temperature control unit is located beneath the copilot's seat or in the outboard portion of the right service compartment.
   B. On Aircraft 25-227 and Subsequent, the temperature control system consists of a AUTO-MAN Temperature Mode Selector, a COLD-HOT Temperature Selector, a cabin temperature sensor, a duct temperature sensor, a duct temperature limiter, a hot air bypass valve, a hot air bypass valve indicator, and a temperature pressure regulator.
   C. Component Description
      (1) On Aircraft 25-061, 25-070 thru 25-226, the temperature control unit is located beneath the copilot's seat adjacent to the cabin temperature sensor.
      (2) On Aircraft 25-061, 25-070 thru 25-226, the cabin temperature sensor is installed beneath the copilot's seat. On Aircraft 25-227 and Subsequent, the cabin temperature sensor is located on the aft side of frame 13D at the top centerline. The sensor assemblies consist of a permanent magnet DC motor (rated at 24 vdc, 0.25 amperes, and 10,500 rpm), a blower secured to the motor shaft by a setscrew, and on Aircraft 25-061, 25-070 thru 25-226, two thermistors mounted below the blower. On Aircraft 25-227 and Subsequent, the sensor assembly consists of a permanent magnet DC motor (rated at 28 vdc, 0.10 amperes, and 5300 rpm) and the temperature sensor. A blower secured to the motor shaft is utilized to direct air across the sensor.
      (3) The cabin skin temperature sensor is bonded to the inner surface of RH skin aft of frame 8 between stringers 11 and 12.
      (4) The duct temperature sensor is installed in the precooled engine bleed air ducting upstream of the cabin air manifold. The sensor monitors the temperature of air entering the cabin.
      (5) On Aircraft 25-061, 25-070 thru 25-226, the high limit thermostat is installed upstream of the duct temperature sensor. The thermostat is installed to protect the temperature control system from overheating.
      (6) On Aircraft 25-227 and Subsequent, the duct temperature limiter is installed in the precooled engine bleed air ducting upstream of the cabin air manifold and before the duct temperature sensor. The duct temperature limiter limits the duct temperature by venting the regulated pressure in the actuator housing of the hot air bypass valve to ambient.

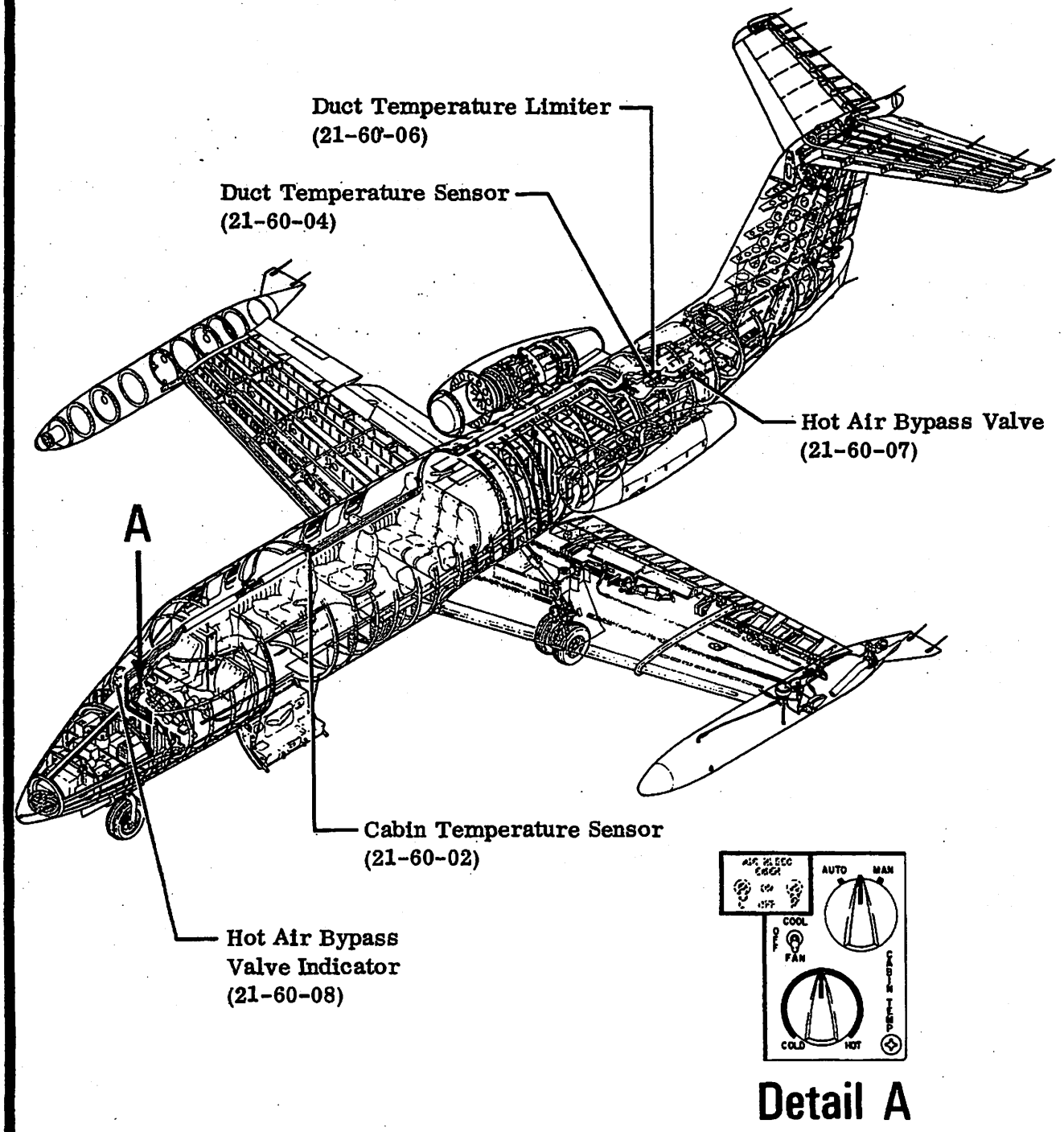


Temperature Control System Locator
Figure 1 (Sheet 1 of 3)



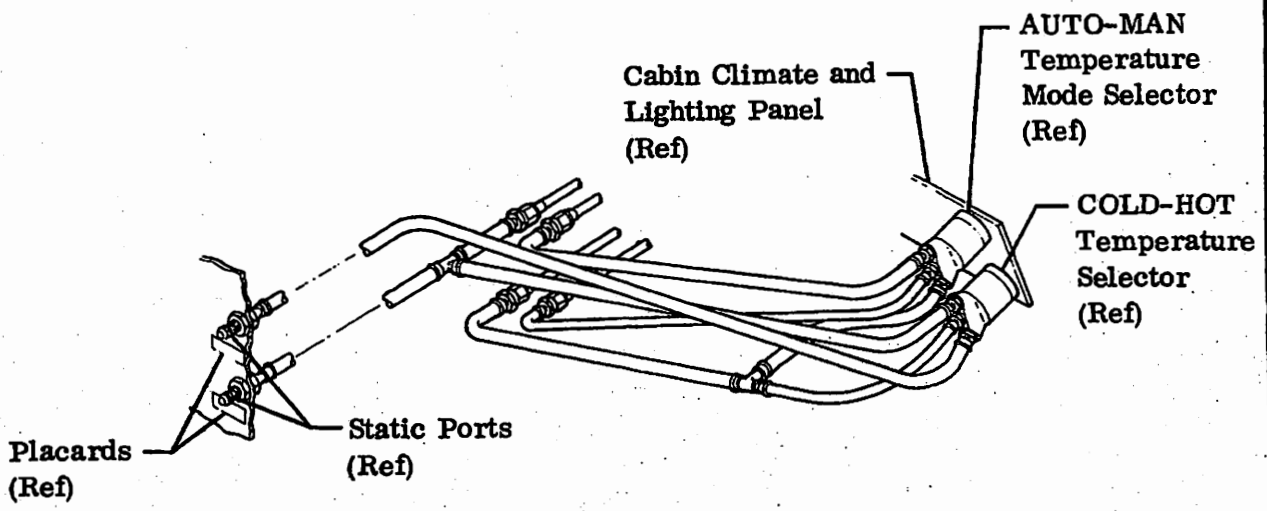
Temperature Control System Locator
Figure 1 (Sheet 2 of 3)

13-117C

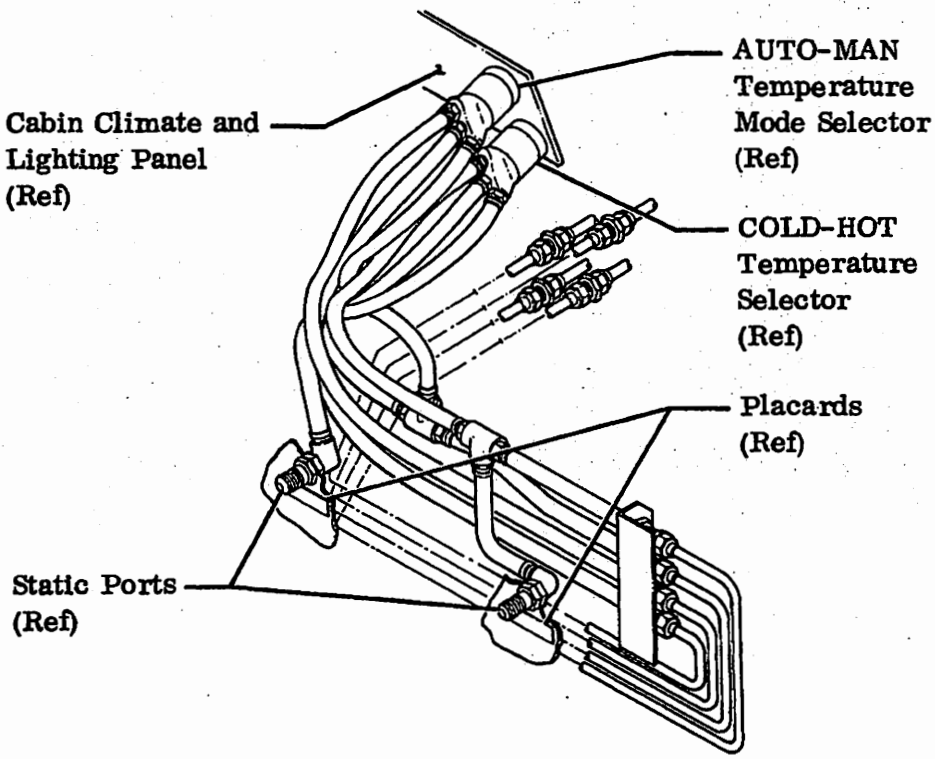


Temperature Control System Locator
Figure 1 (Sheet 3 of 3)

13-119B-1



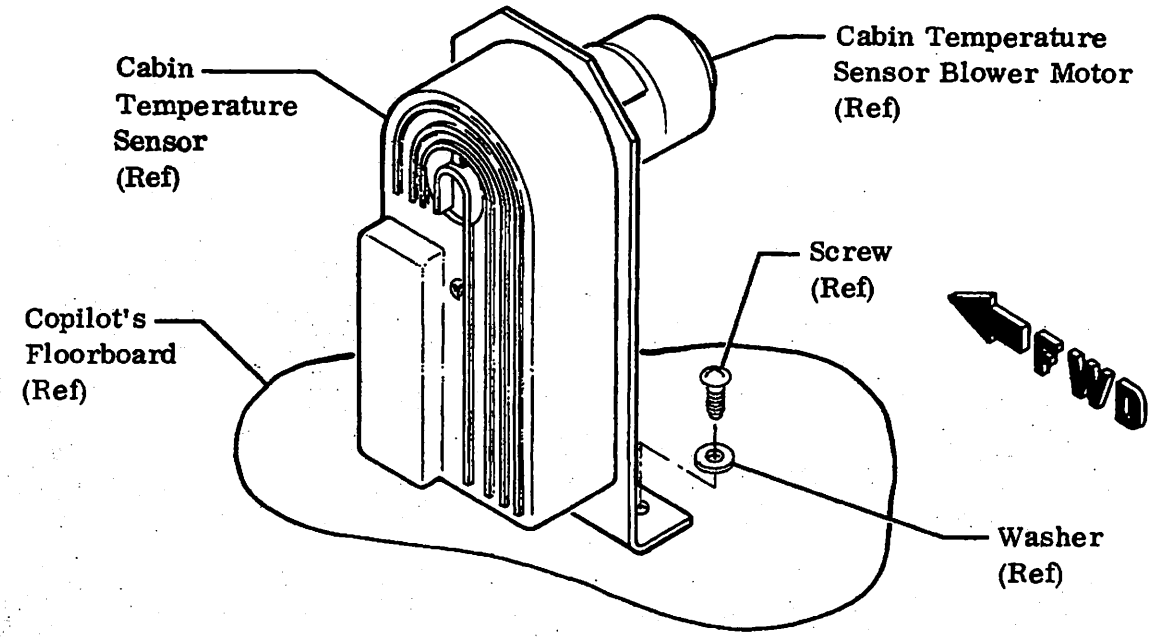
25-227 Thru 25-256, except aircraft modified per SSK 945,
(Replacement of Manual Override and Cabin Temperature Controls)



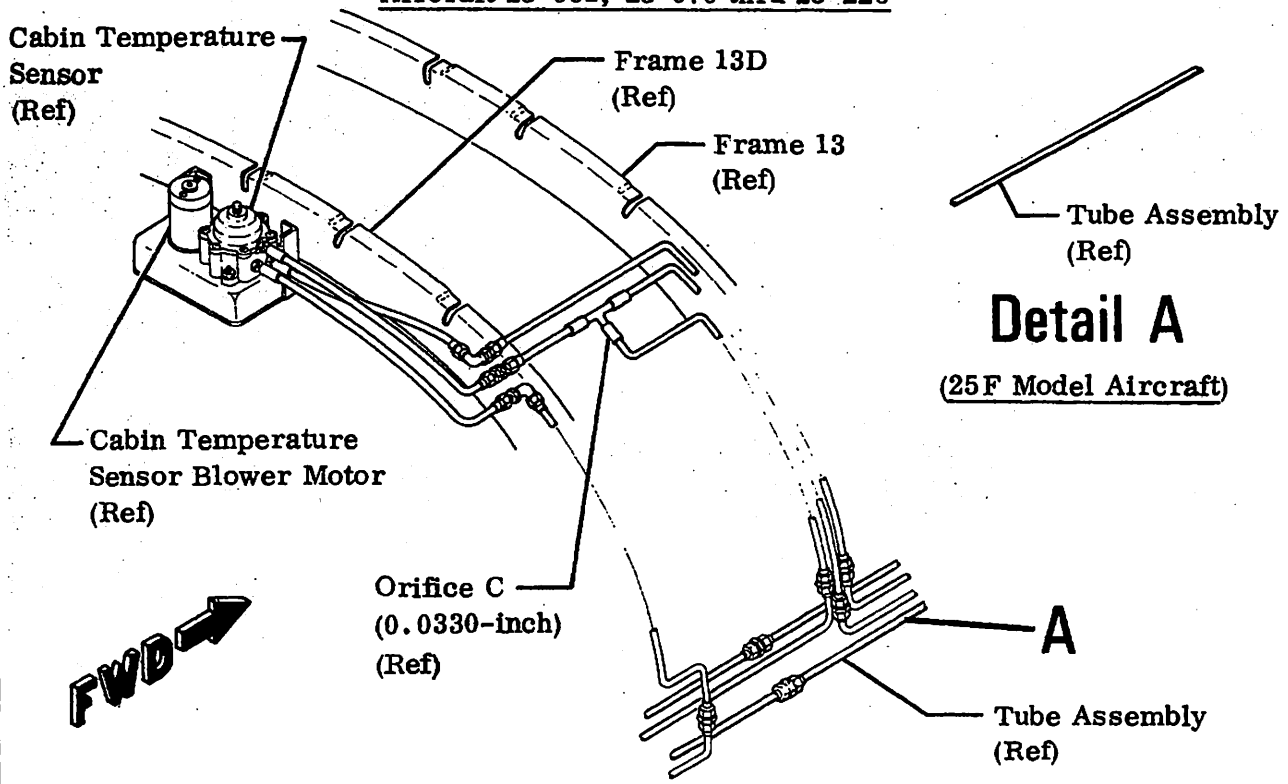
25-257 and Subsequent, and prior aircraft modified per SSK 945,
(Replacement of Manual Override and Cabin Temperature Controls)

Temperature Control System Installation
Figure 2 (Sheet 1 of 9)

13-107C
13-119C-2



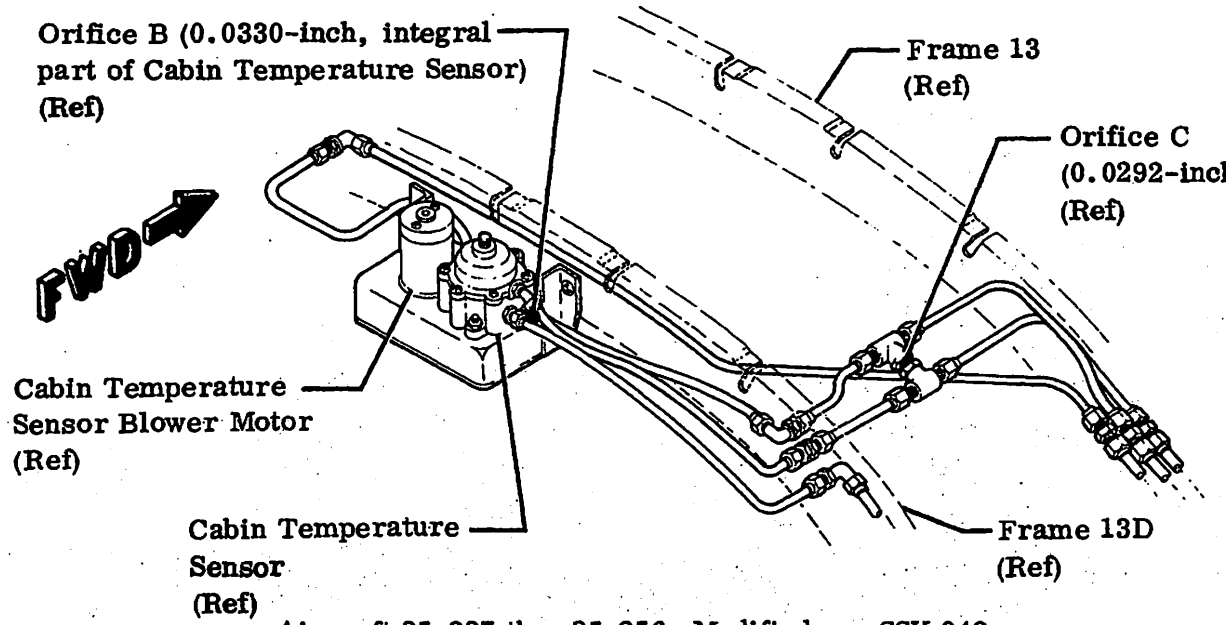
Aircraft 25-061, 25-070 thru 25-226



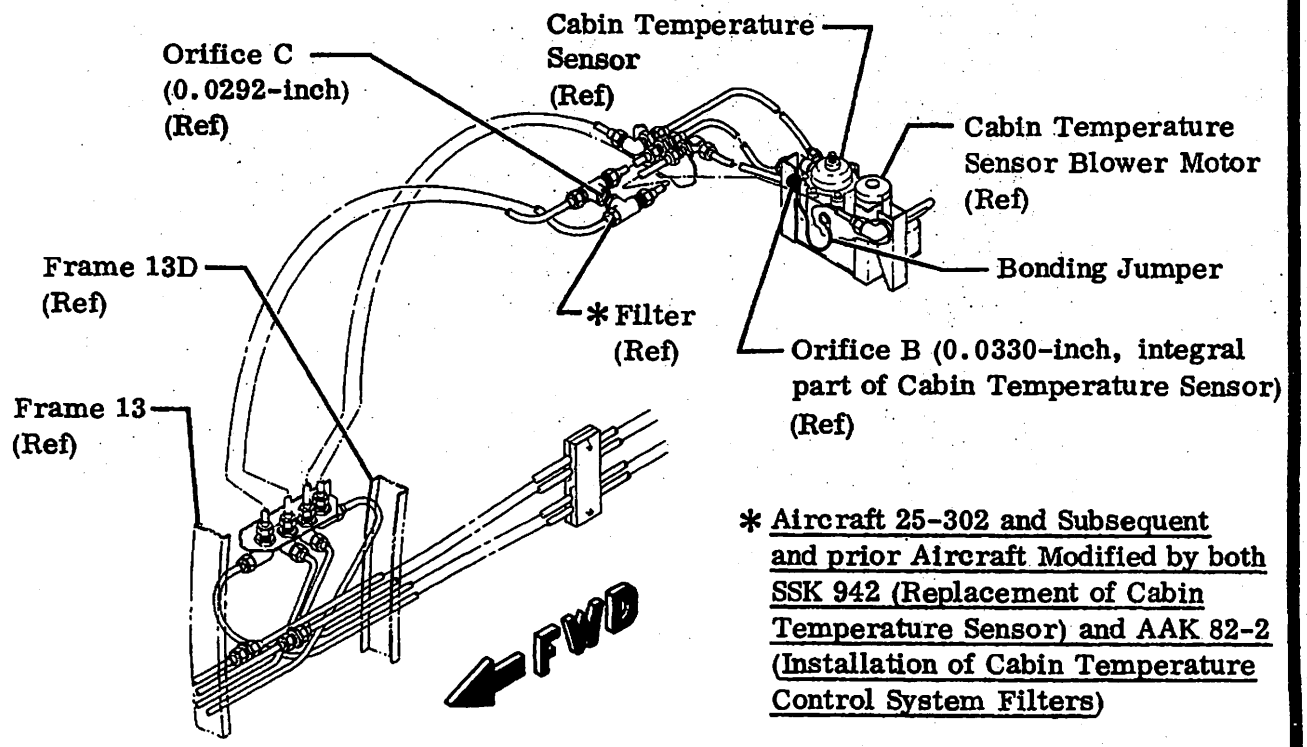
Aircraft 25-227 thru 25-256, not Modified per SSK 942 (Replacement of Cabin Temperature Sensor)

Temperature Control System Installation
Figure 2 (Sheet 2 of 9)

13-43B-1
13-98B
13-117B-1



Aircraft 25-227 thru 25-256, Modified per SSK 942 (Replacement of Cabin Temperature Sensor)

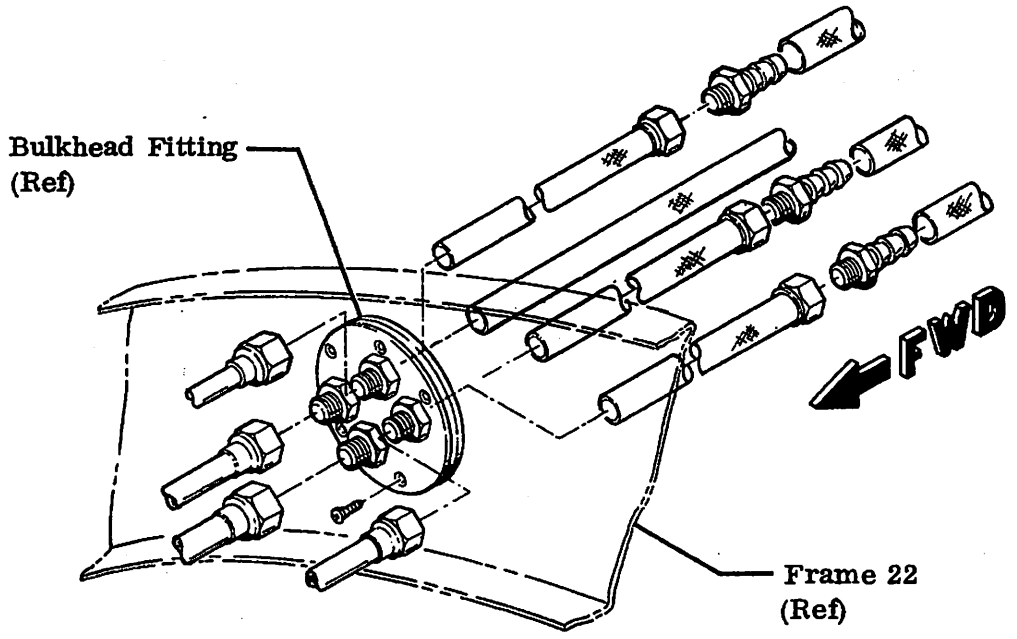


* Aircraft 25-302 and Subsequent and prior Aircraft Modified by both SSK 942 (Replacement of Cabin Temperature Sensor) and AAK 82-2 (Installation of Cabin Temperature Control System Filters)

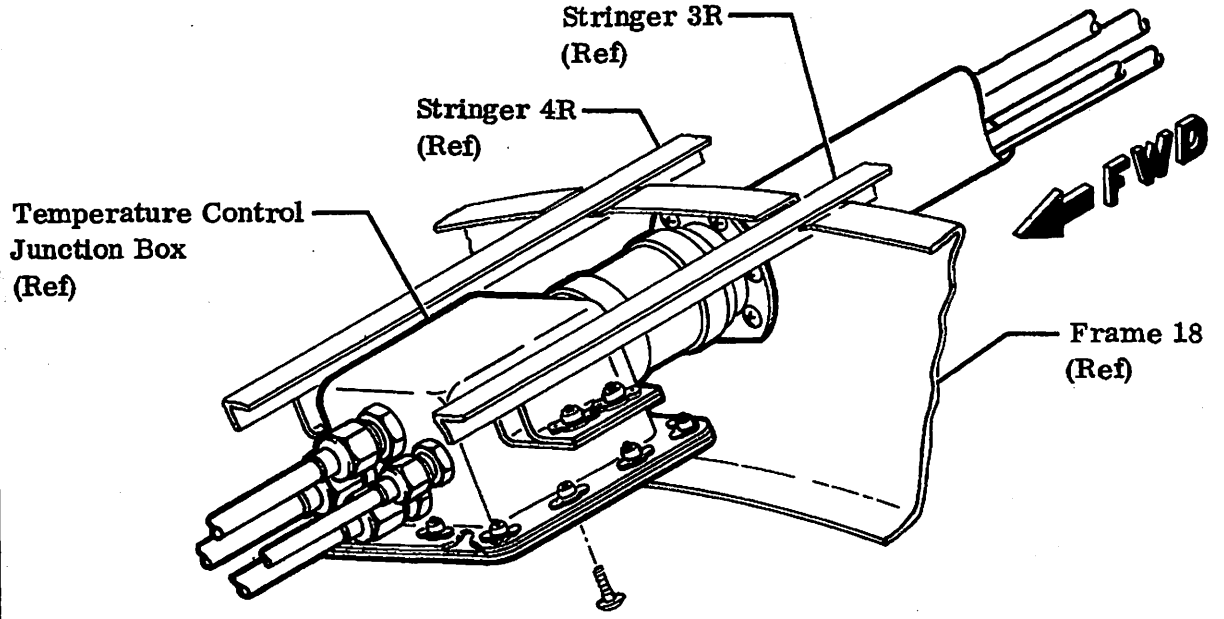
Aircraft 25-257 and Subsequent

Cabin Temperature Control System Installation .ation
Figure 2 (Sheet 3 of 9)

13-98B-1
13-119C-2



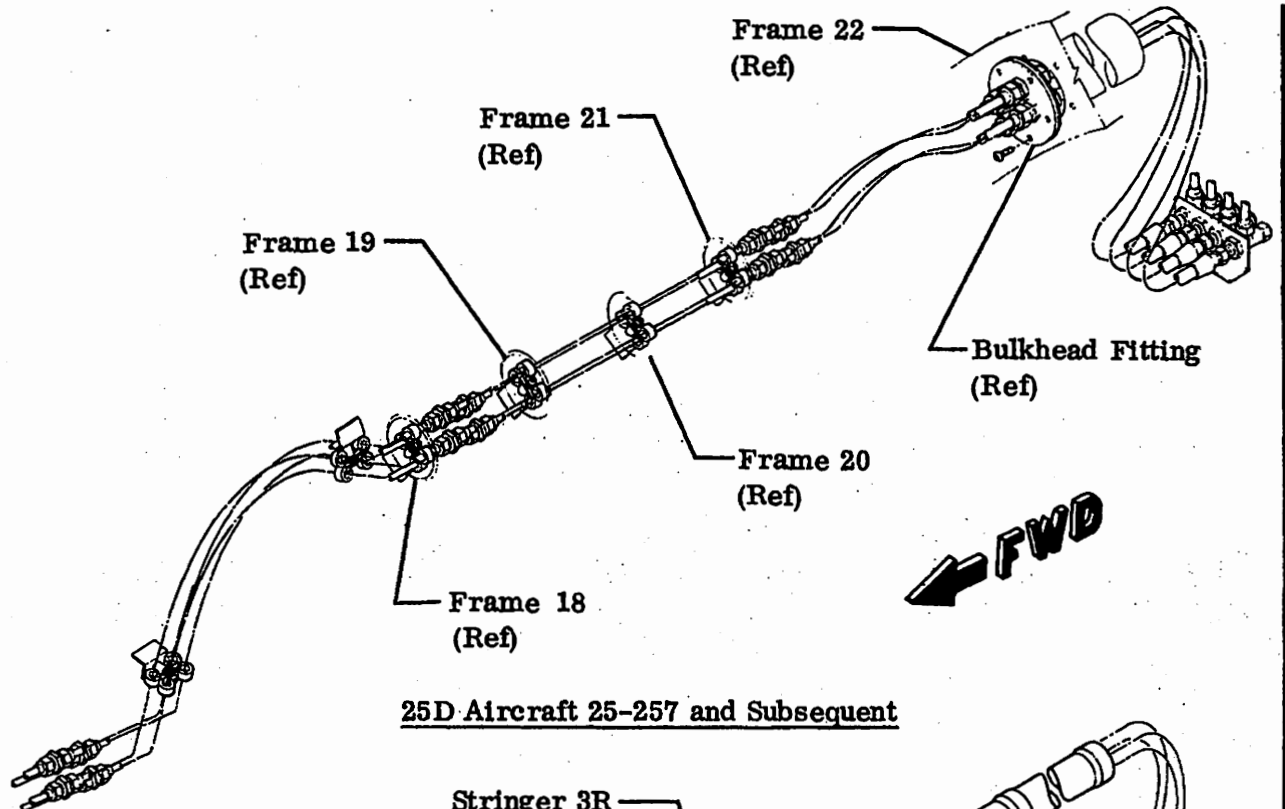
25D Aircraft 25-227 thru 25-256



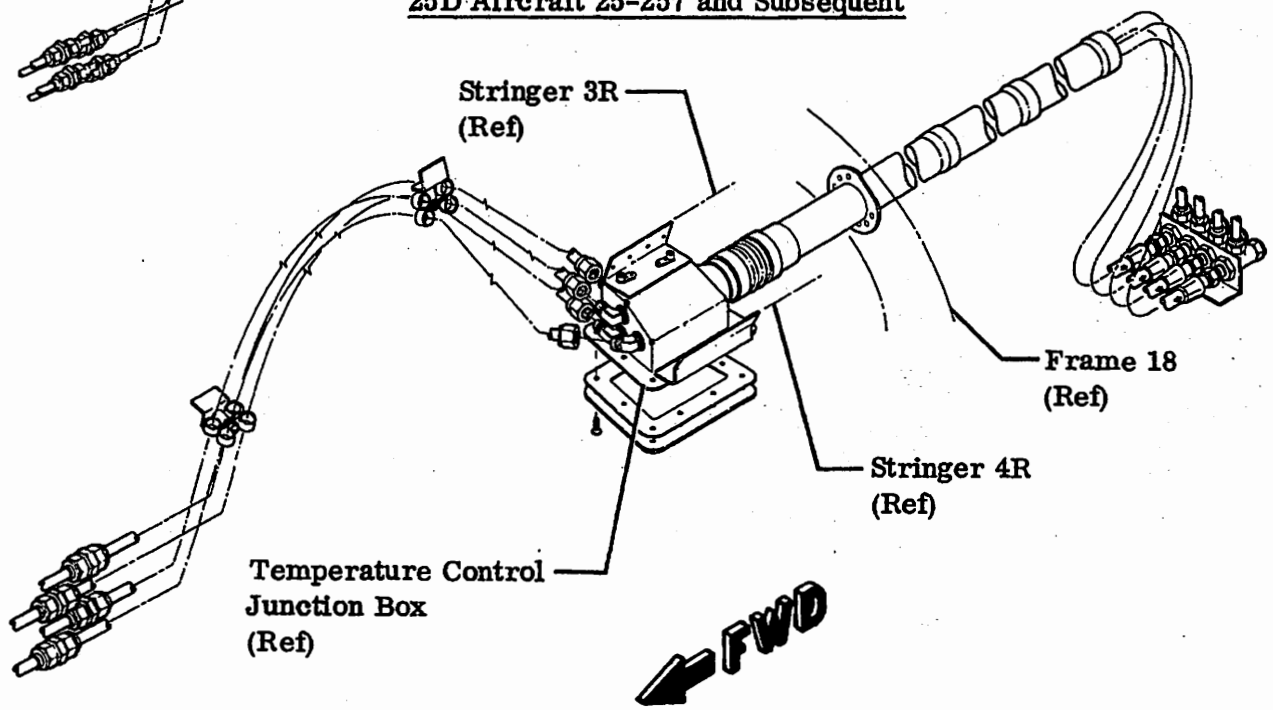
25F Aircraft 25-227 thru 25-256

Temperature Control System Installation
Figure 2 (Sheet 4 of 9)

13-117A
13-99D

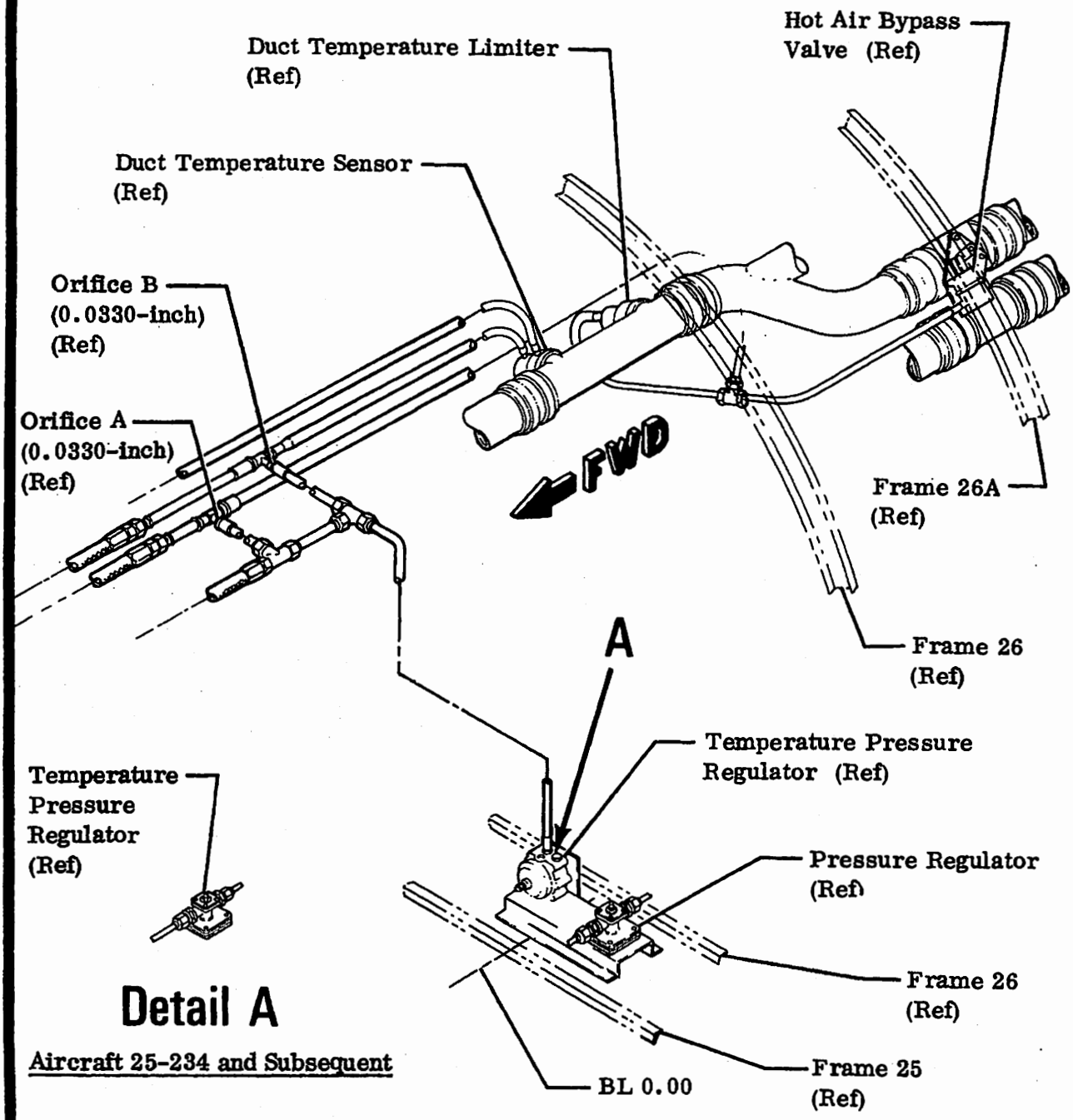


25D Aircraft 25-257 and Subsequent



25F Aircraft 25-257 and Subsequent

Temperature Control System Installation
Figure 2 (Sheet 5 of 9)



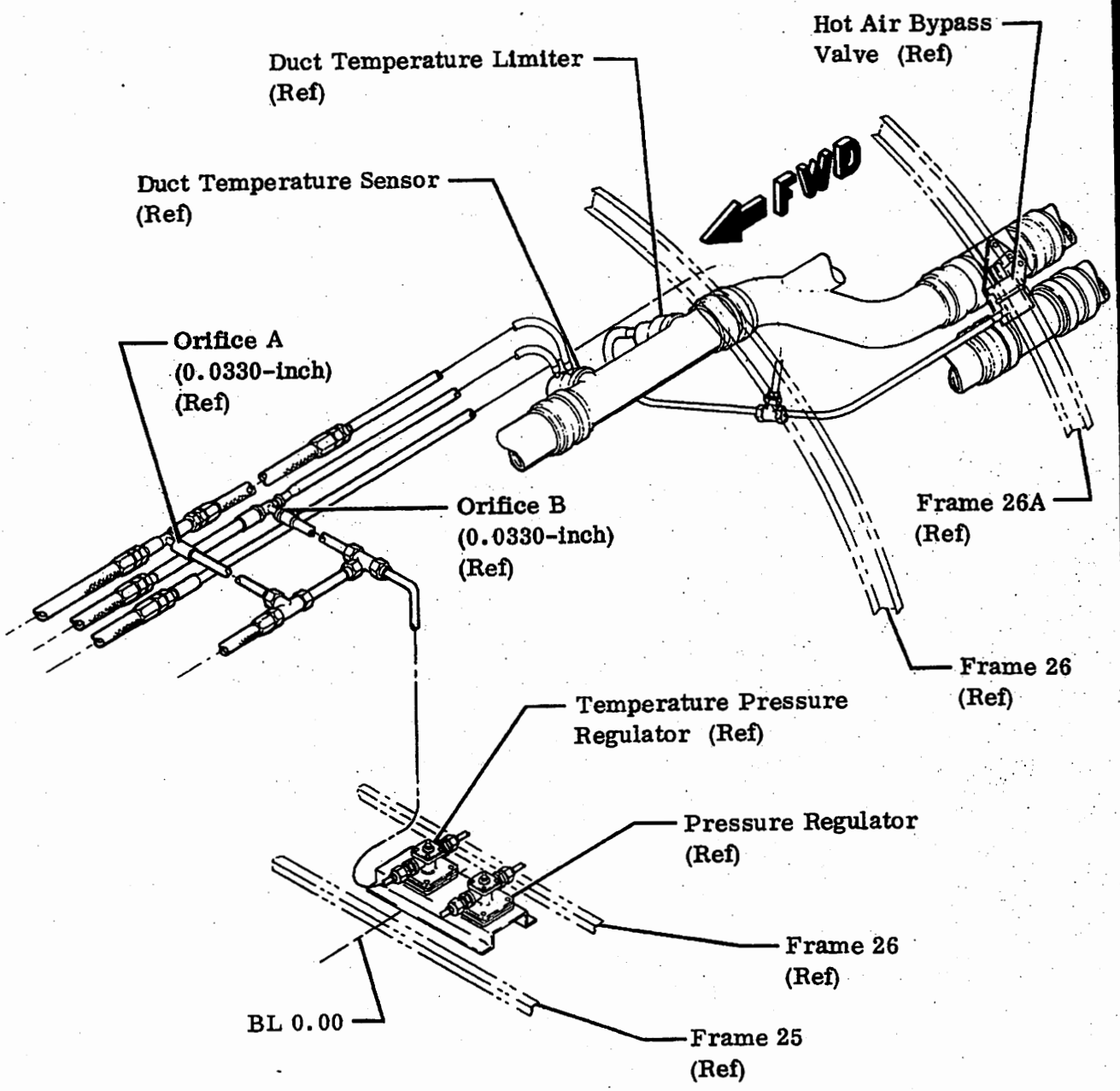
Detail A

Aircraft 25-234 and Subsequent

25D Aircraft 25-227 thru 25-245, and 25F Aircraft 25-227 thru 25-237 not Modified per SSK 943 (Replacement of Duct Temperature Sensor and Limiter) and SSK 942 (Replacement of Cabin Temperature Sensor)

Temperature Control System Installation
Figure 2 (Sheet 6 of 9)

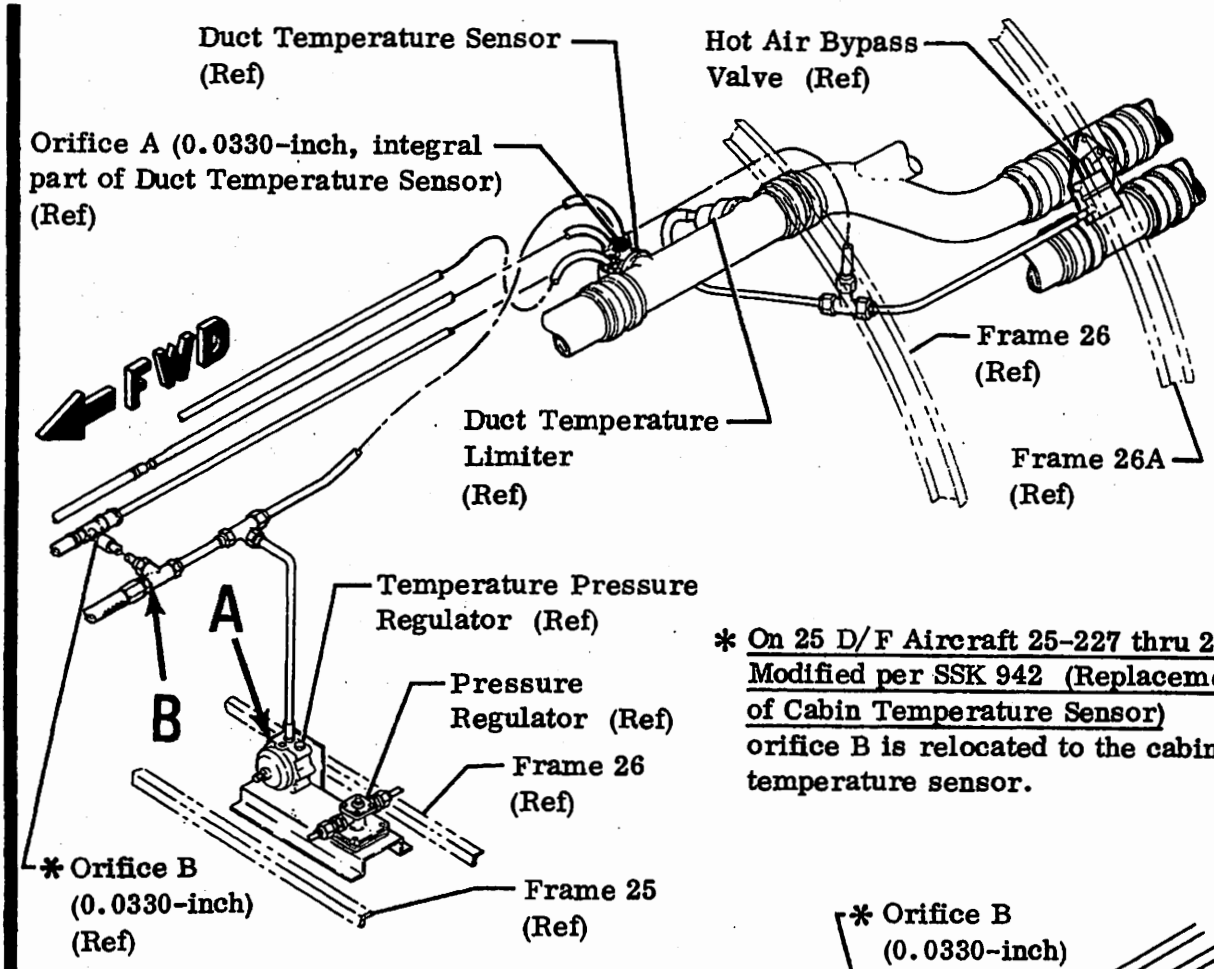
13-117B
13-117B-2



25D Aircraft 25-246 thru 25-256, and 25F Aircraft 25-238 thru 25-256 not Modified per SSK 943 (Replacement of Duct Temperature Sensor and Limiter) and SSK 942 (Replacement of Cabin Temperature Sensor)

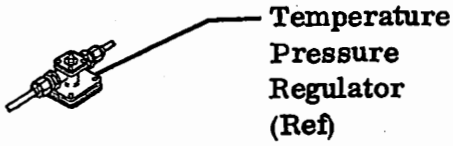
Temperature Control System Installation
Figure 2 (Sheet 7 of 9)

13-117B



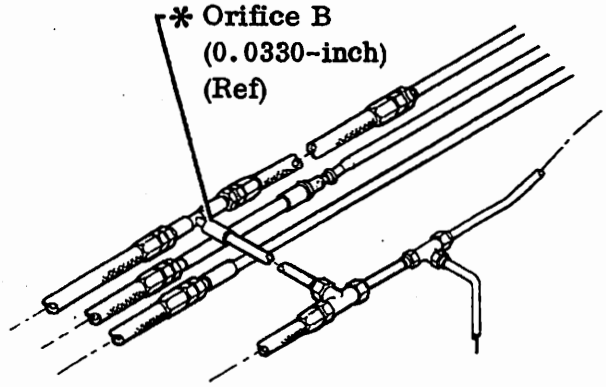
* On 25 D/F Aircraft 25-227 thru 25-256 Modified per SSK 942 (Replacement of Cabin Temperature Sensor) orifice B is relocated to the cabin temperature sensor.

25D Aircraft 25-227 thru 25-245, and 25F Aircraft 25-227 thru 25-237 Modified per SSK 943 (Replacement of Duct Temperature Sensor and Limiter)



Detail A

Aircraft 25-234 and Subsequent

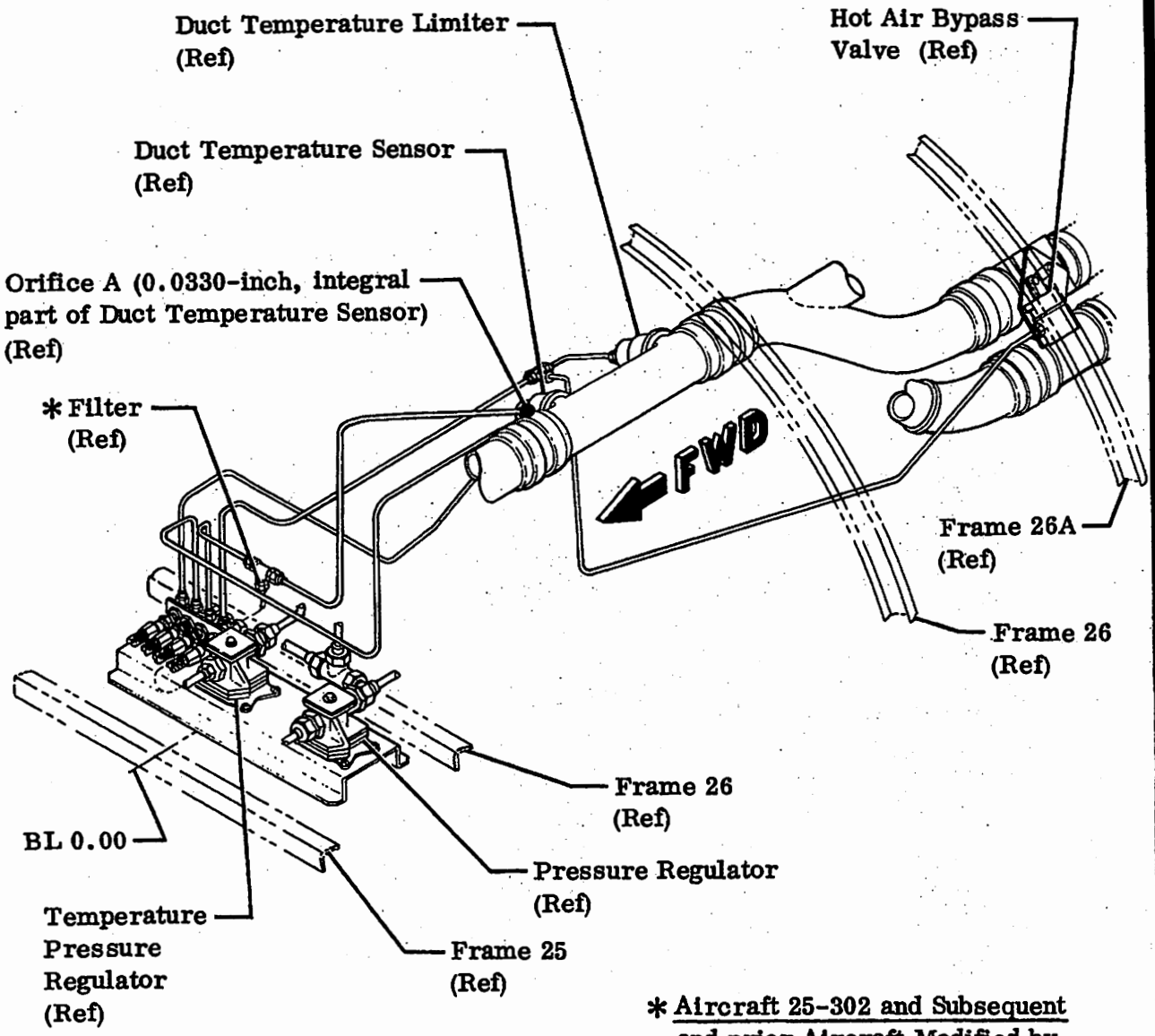


Detail B

25D Aircraft 25-246 thru 25-256, and 25F Aircraft 25-238 thru 25-256 Modified per SSK 943 (Replacement of Duct Temperature Sensor and Limiter)

Temperature Control System Installation
Figure 2 (Sheet 8 of 9)

13-117B



* Aircraft 25-302 and Subsequent and prior Aircraft Modified by AAK 82-2 (Installation of Cabin Temperature Control System Filters)

25 D/F Aircraft 25-257 and Subsequent

Temperature Control System Installation
Figure 2 (Sheet 9 of 9)

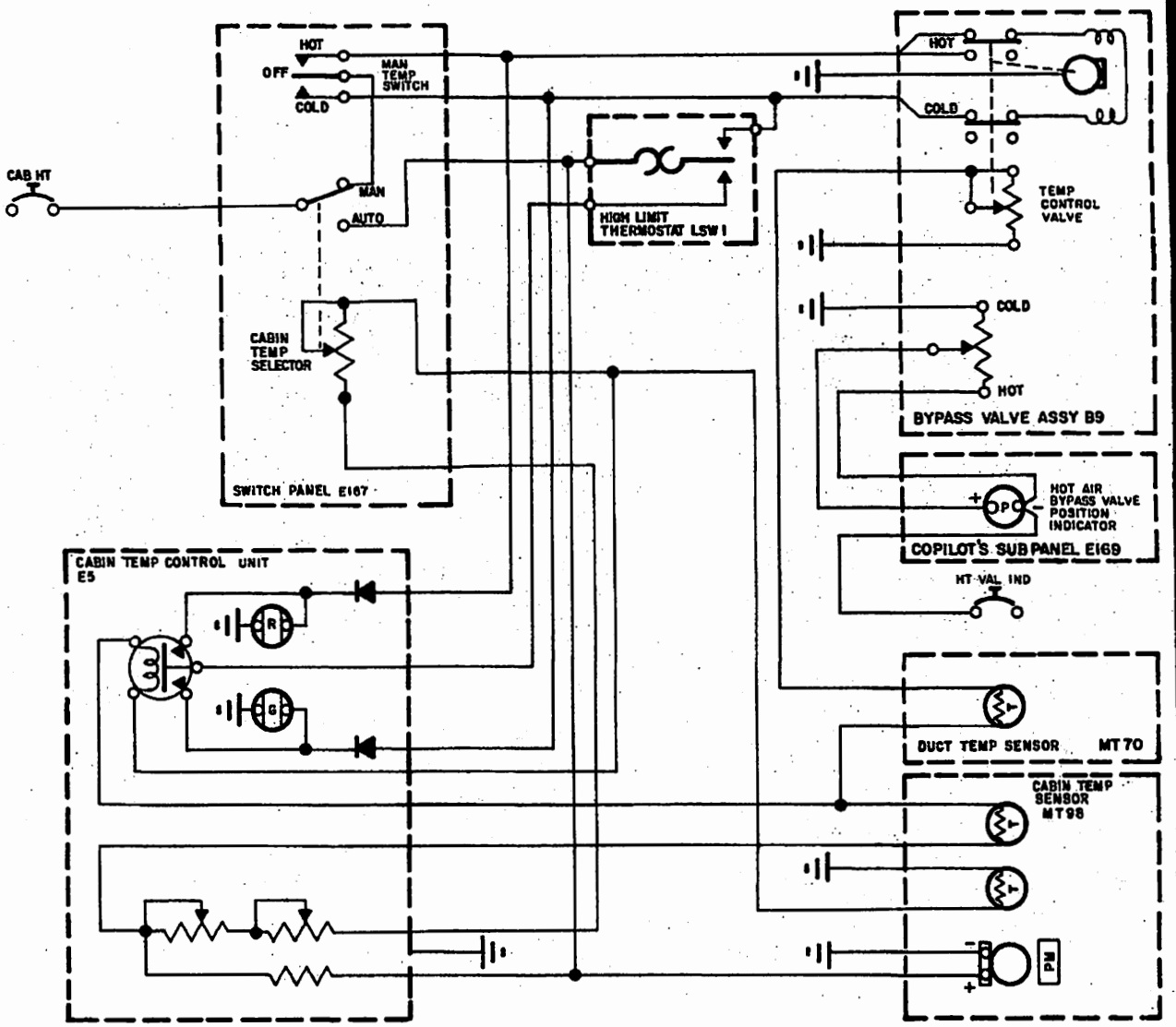
(7) The hot air bypass valve is installed in both the bleed air and precooled air ducts adjacent to the heat exchanger. The bypass valve controls the amount of bleed air routed through the heat exchanger and the amount allowed to bypass.

(8) The hot air bypass valve indicator is installed on the copilot's subpanel. The potentiometers, used to adjust the indicator, are installed on a bracket attached to the copilot's subpanel.

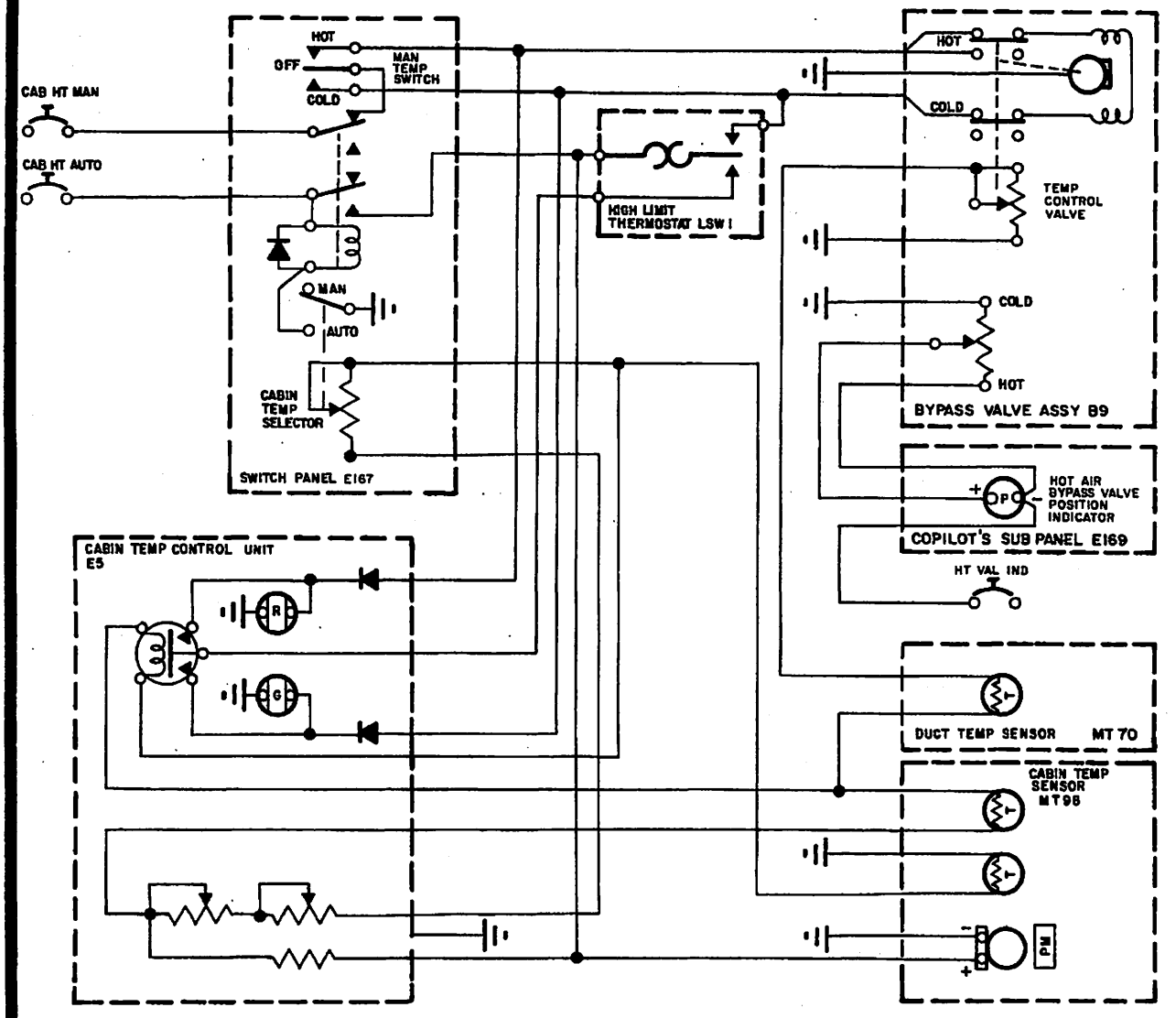
2. Operation (See figures 3 and 4.)

A. On Aircraft 25-061, 25-070 thru 25-089 and 25-091 thru 25-094, the temperature control system is based on a temperature-sensitive resistance bridge circuit using a micropositioner (an ultrasensitive polarized relay) as the bridge unbalance detector. The MAN-AUTO-HOT Temperature Selector, temperature control unit, cabin temperature sensor, duct temperature sensor, and hot air bypass valve potentiometer form this bridge circuit. The relative resistance of the cabin temperature sensor and the duct temperature sensor determines the amplitude and polarity of the unbalance signal through the micropositioner coil. The micropositioner contacts close and automatically move the bypass valve actuator in the proper direction. The system incorporates two indicator lights located in the temperature control unit. These lights (one red and one green) are illuminated when the micropositioner is energized. A potentiometer, mechanically connected to the bypass valve actuator shaft, also moves and rebalances the bridge circuit. When the bridge circuit is rebalanced, the contacts of the micropositioner are opened and the bypass valve actuator remains in the selected position. In case of temperature control system malfunction, the high limit thermostat acts as a protective device. The thermostat removes power from the bridge circuit and completes a power circuit to the closed side of the bypass valve actuator.

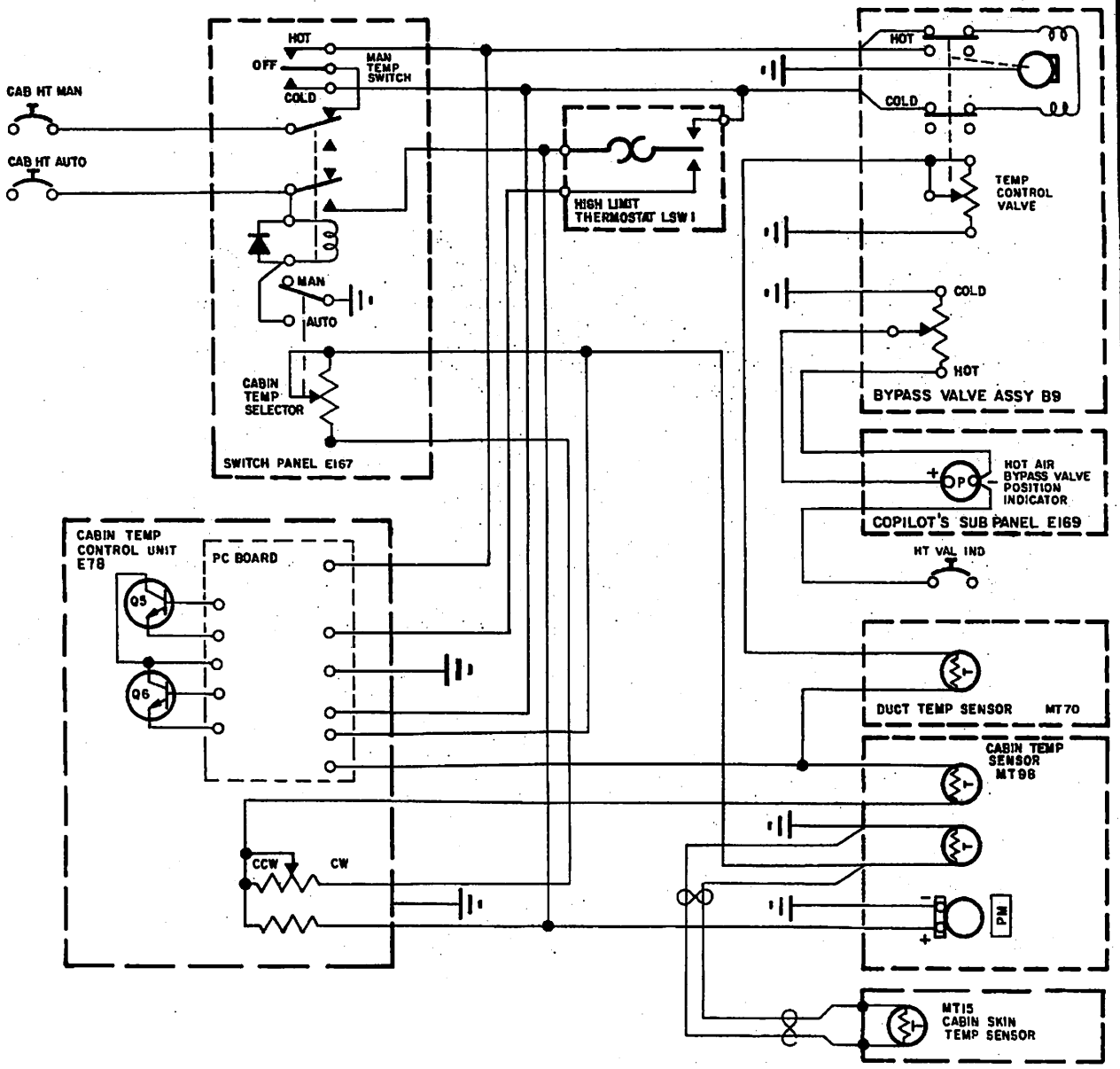
B. On Aircraft 25-090, 25-095 thru 25-226, the temperature control system is based on a temperature-sensitive resistance bridge circuit using a comparator circuit as the bridge unbalance detector. The temperature selector switch, temperature control unit, cabin temperature sensor, duct temperature sensor, cabin skin temperature sensor, and hot air bypass valve potentiometer form this bridge circuit. The relative resistance of the cabin temperature sensor, the duct temperature sensor, and the cabin skin temperature sensor determines the amplitude and polarity of the unbalance signal applied to the comparator circuit. The comparator circuit senses the amplitude and polarity of the unbalance input signal and automatically moves the hot air bypass valve in the proper direction. A potentiometer, mechanically connected to the hot air bypass valve shaft, also moves and rebalances the bridge circuit. When the bridge circuit is rebalanced, the hot air bypass valve will stop in its new position. The system also incorporates two indicator lights located in the temperature control box. These lights (one red and one green) are illuminated when the comparator circuit is in an unbalanced condition. The red indicator light, when illuminated, indicates the bridge circuit is unbalanced in a heating direction. The green indicator light, when illuminated, indicates the bridge circuit is unbalanced in a cooling direction.



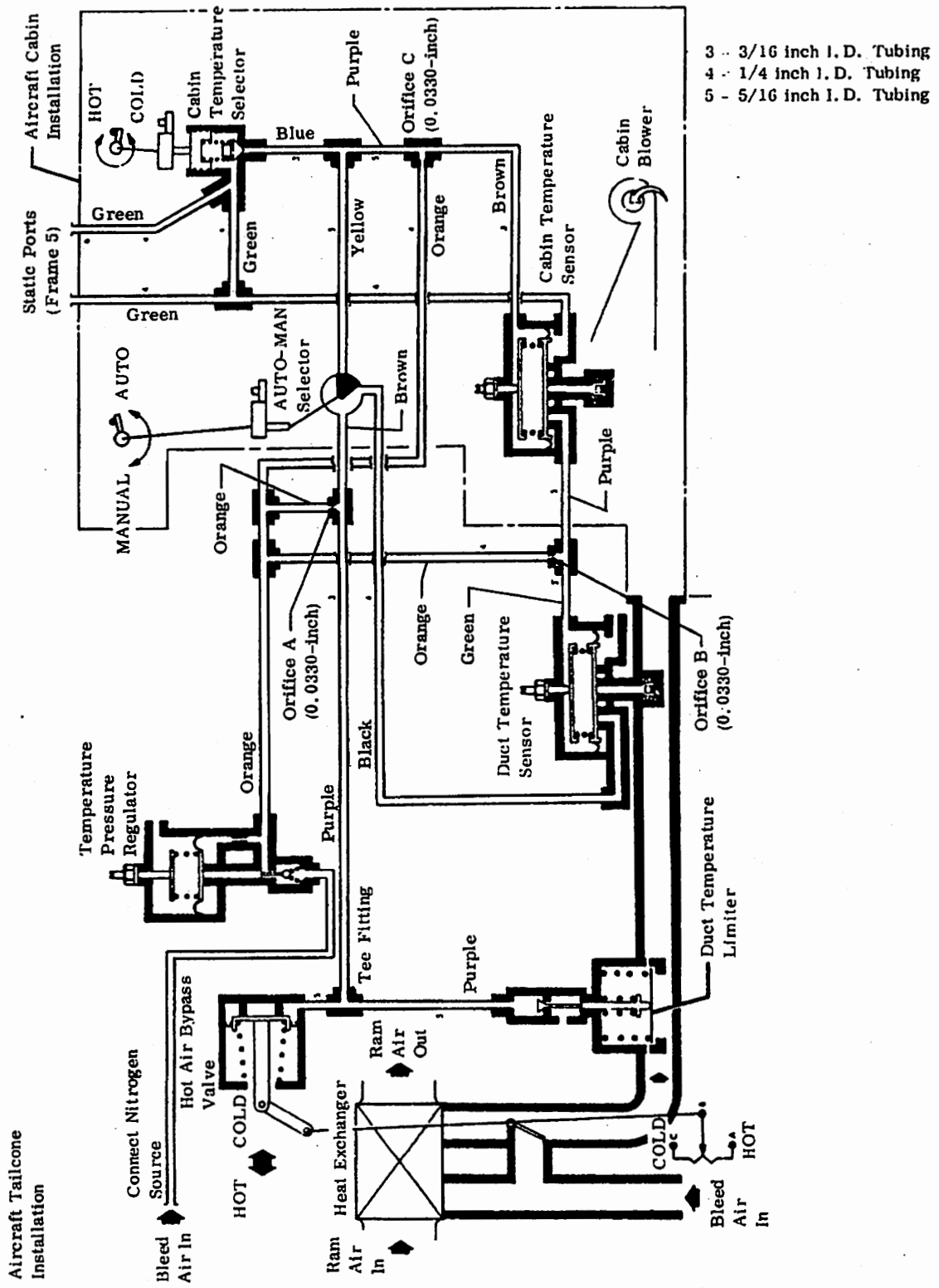
Temperature Electrical Control Schematic
Figure 3 (Sheet 1 of 3)



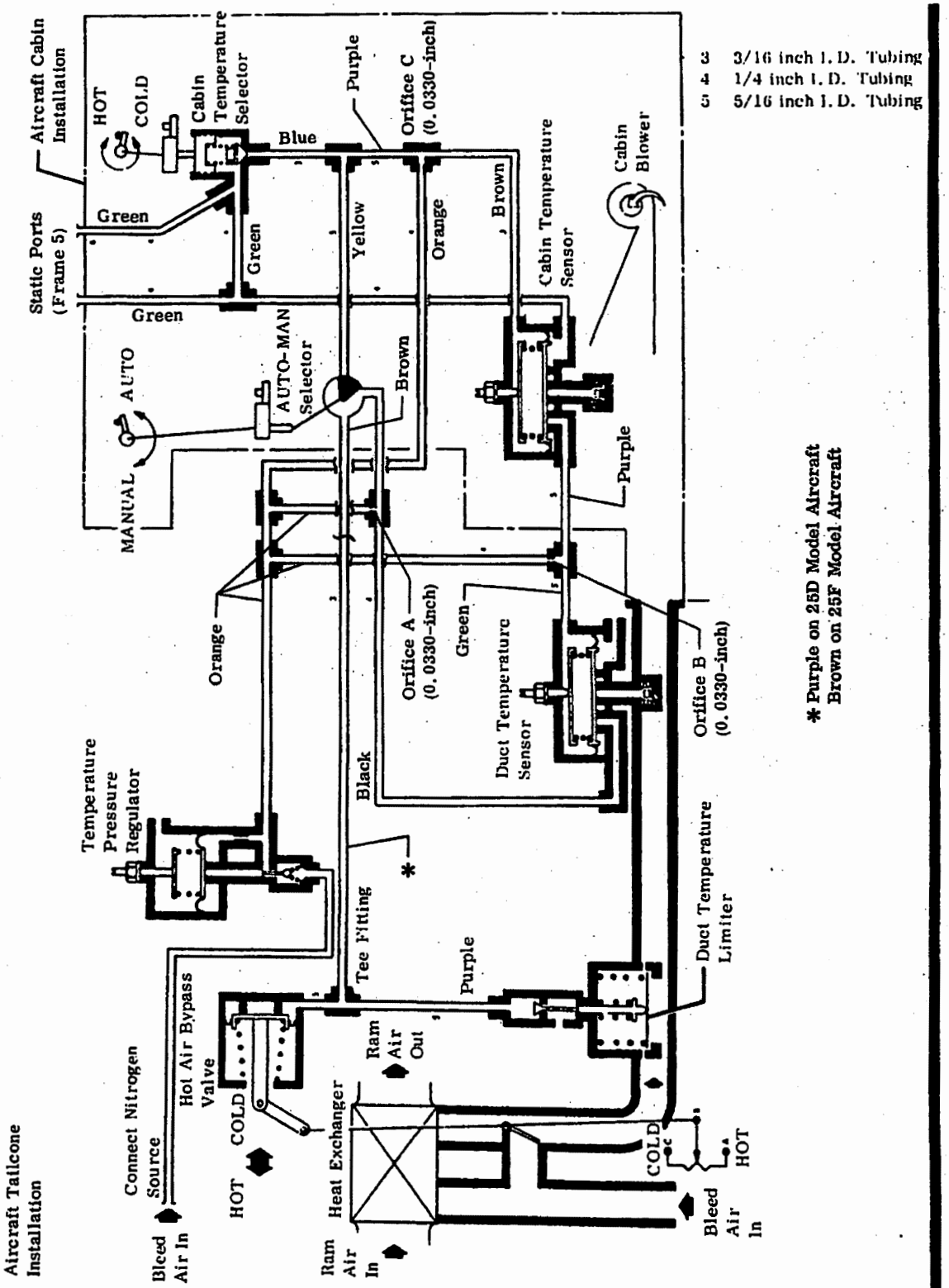
Temperature Electrical Control Schematic
Figure 3 (Sheet 2 of 3)



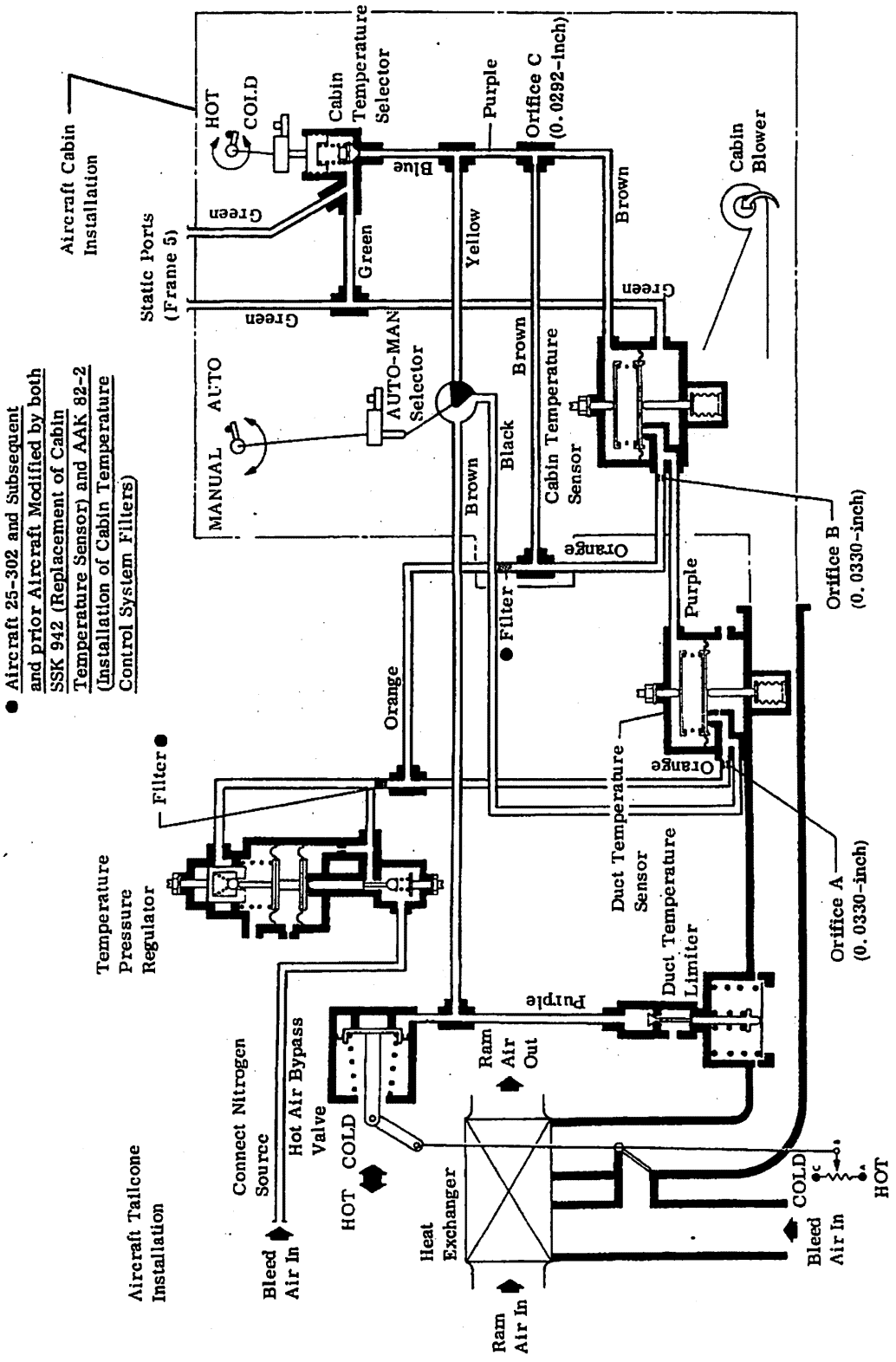
Temperature Electrical Control Schematic
Figure 3 (Sheet 3 of 3)



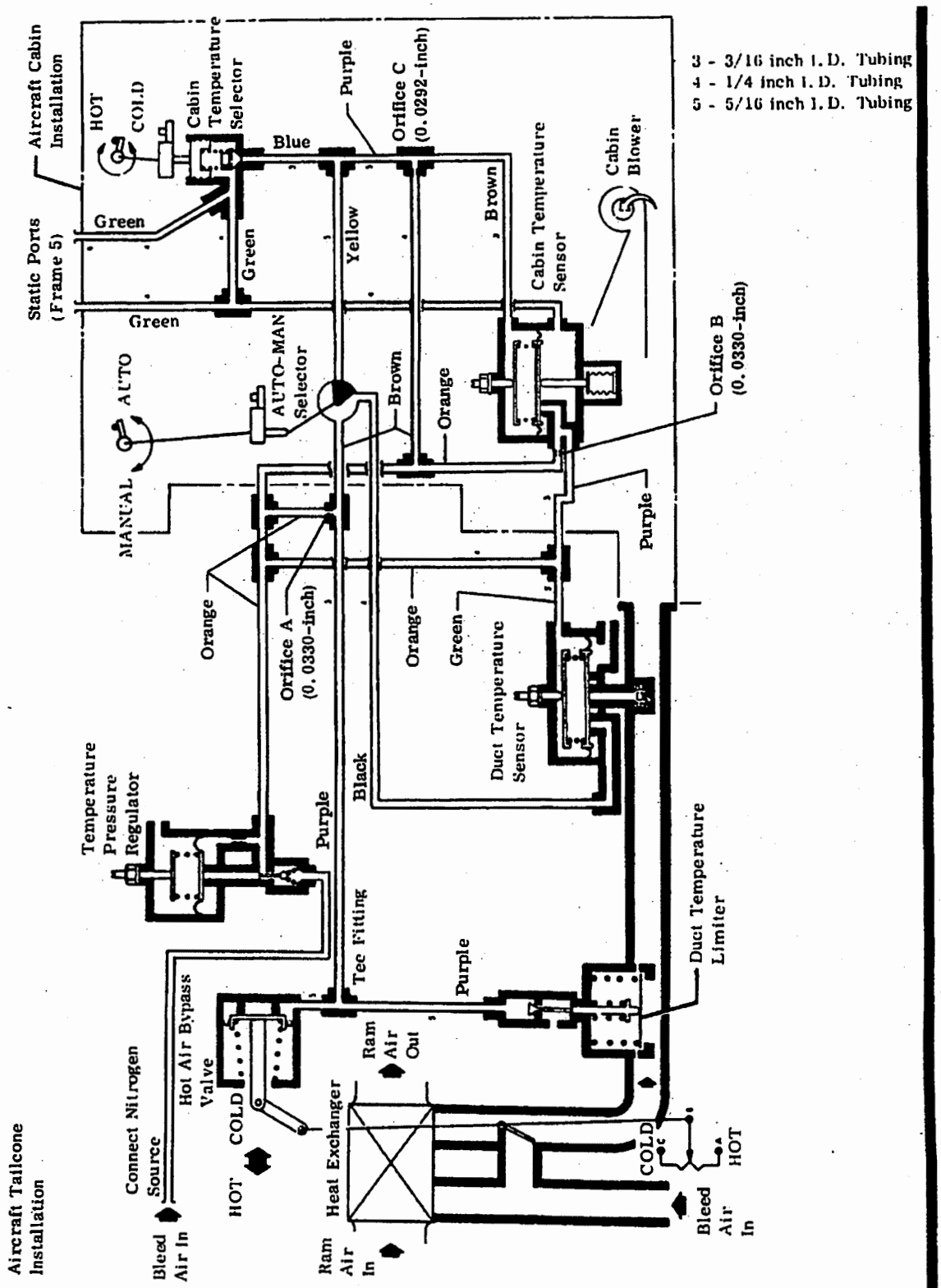
Temperature Control System Schematic
Figure 4 (Sheet 1 of 9)



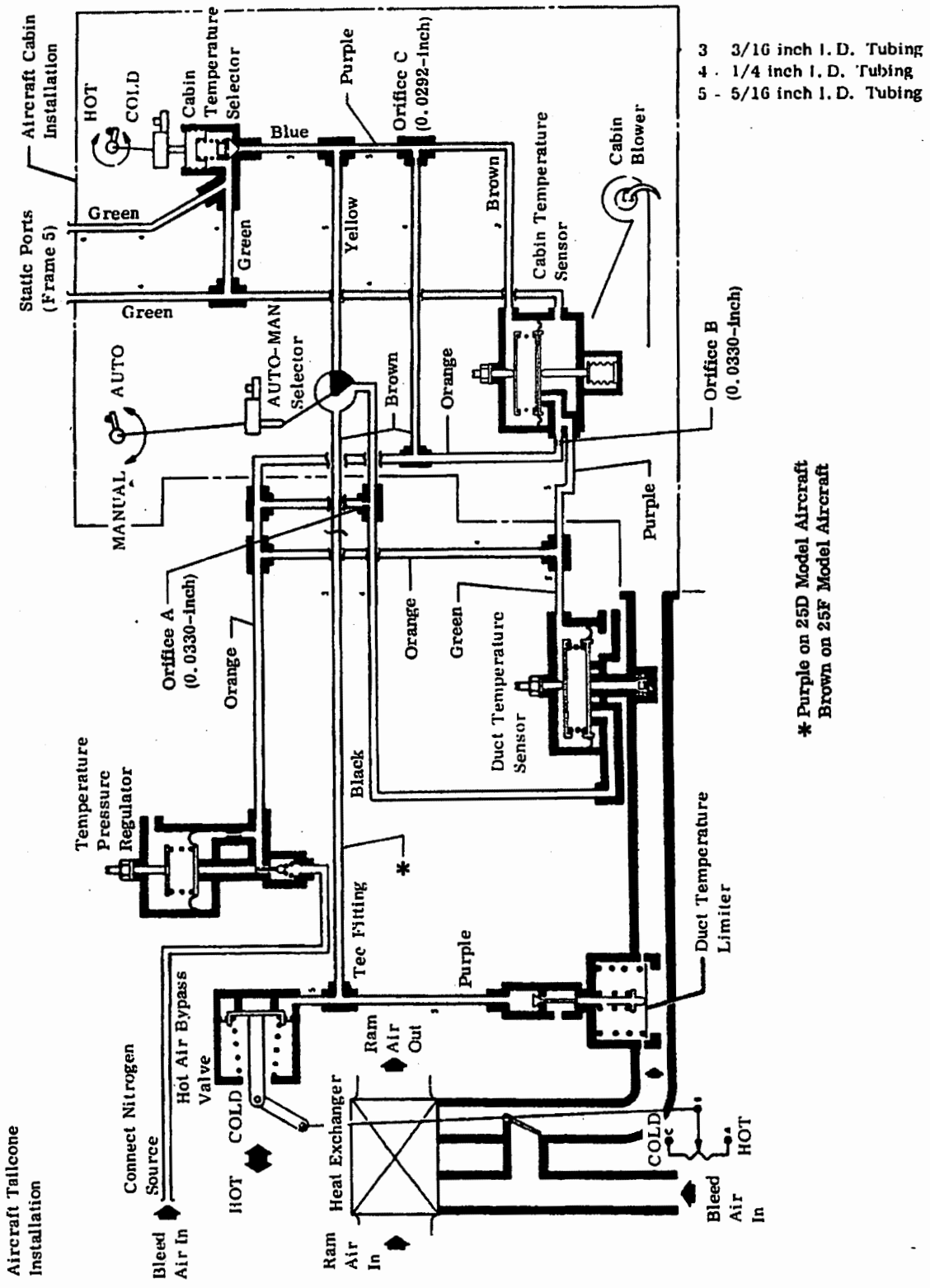
Temperature Control System Schematic
Figure 4 (Sheet 2 of 9)



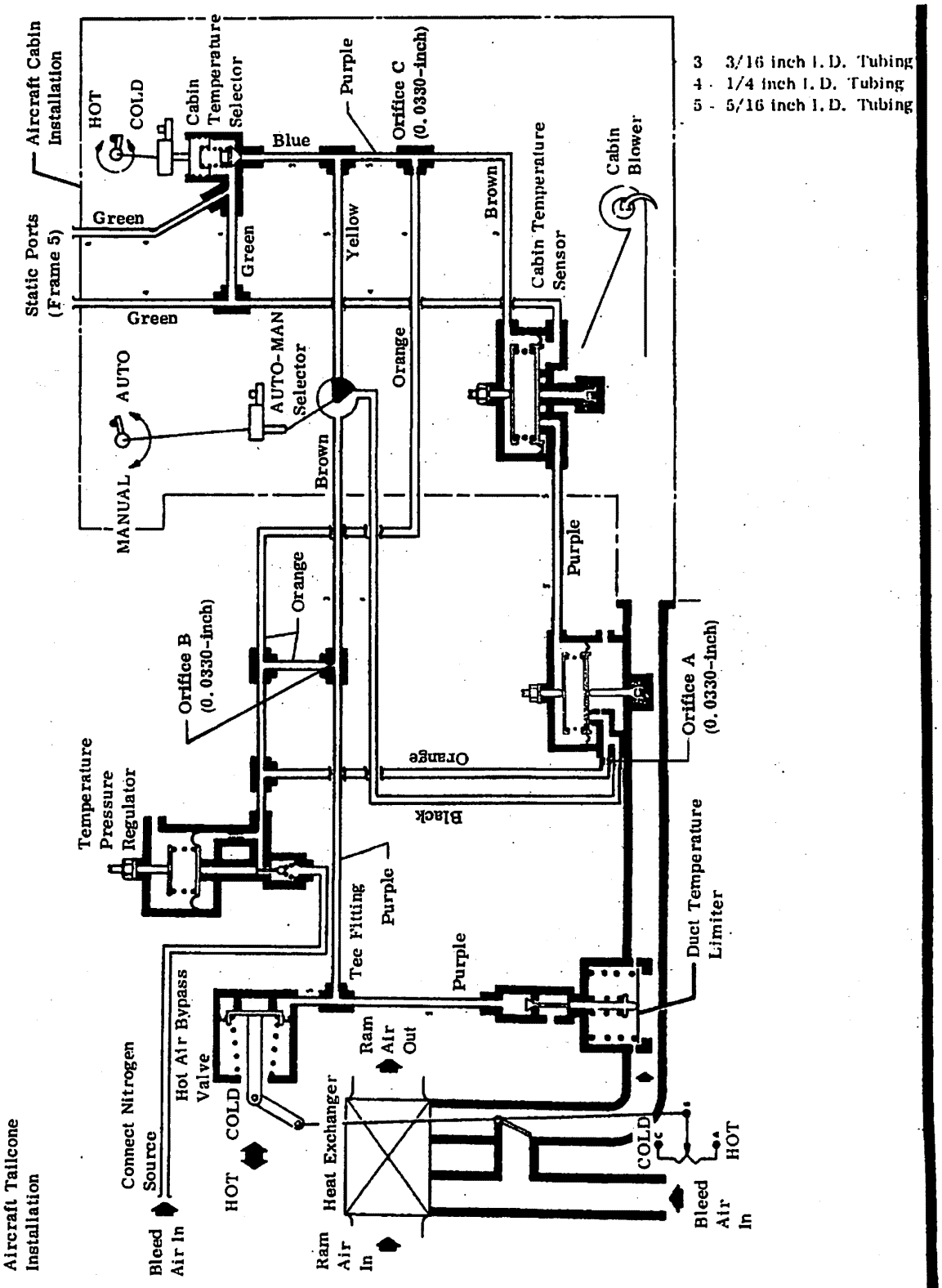
Temperature Control System Schematic
Figure 4 (Sheet 3 of 9)



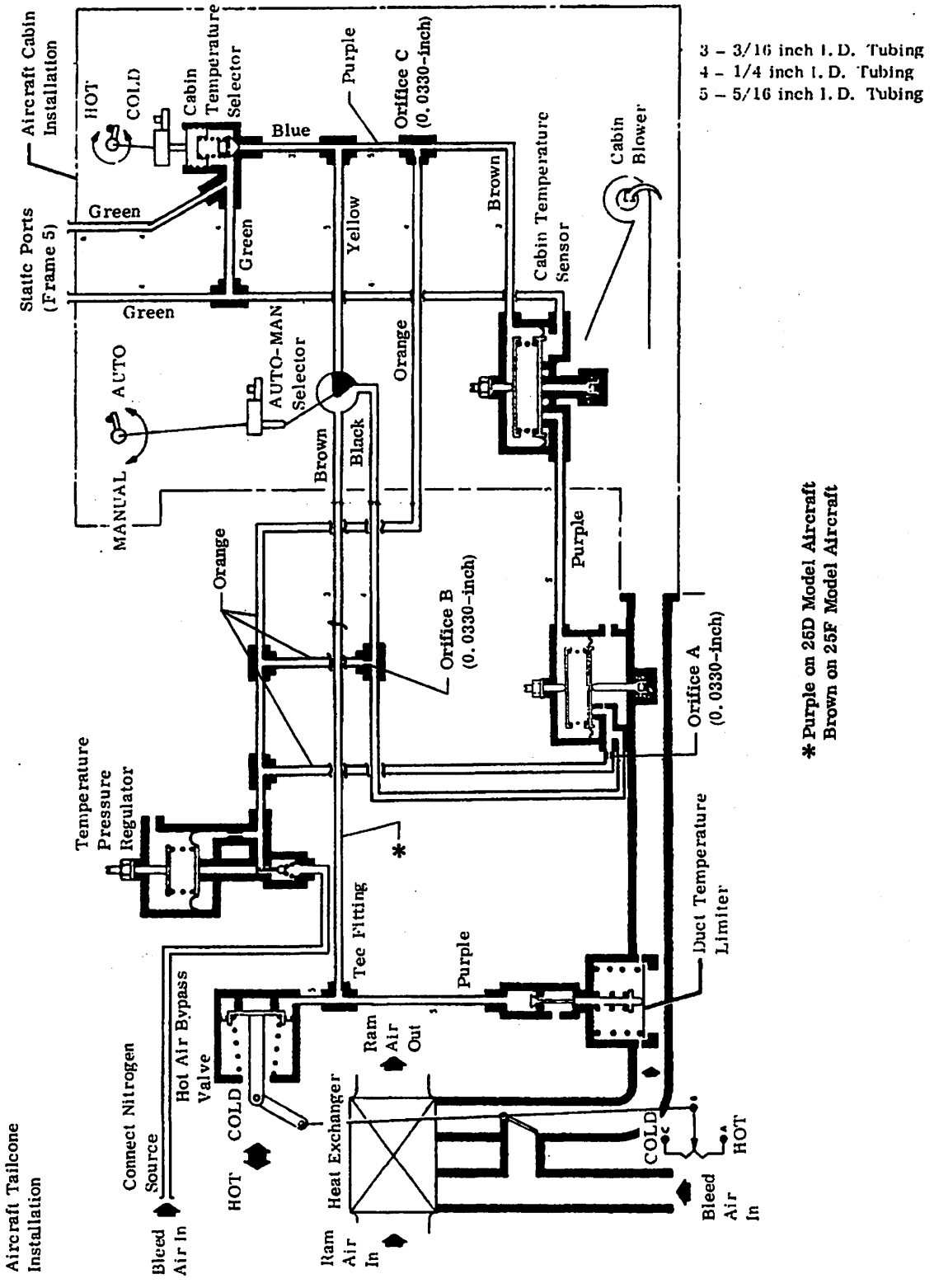
Temperature Control System Schematic
Figure 4 (Sheet 4 of 9)



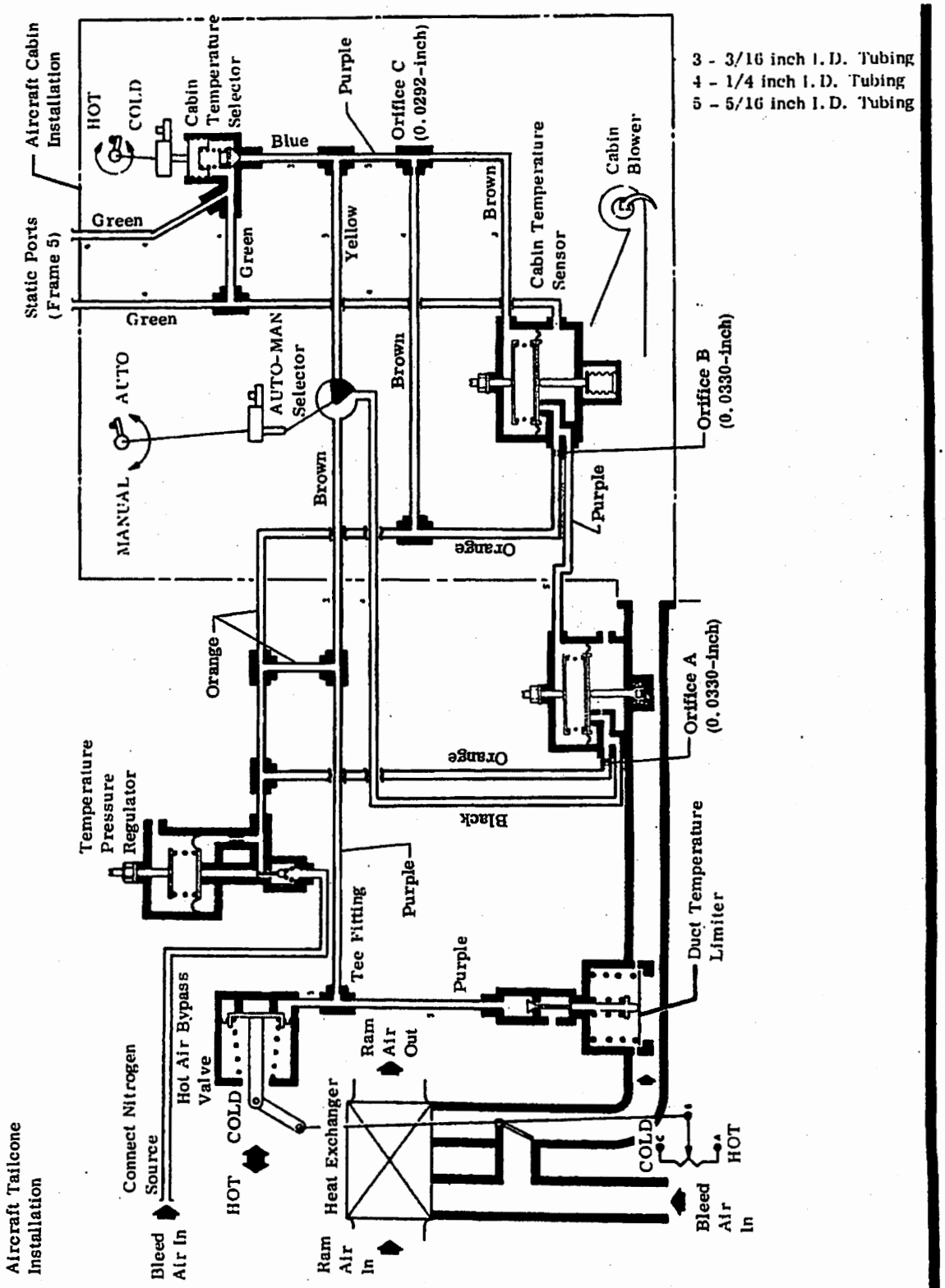
Temperature Control System Schematic
Figure 4 (Sheet 5 of 9)



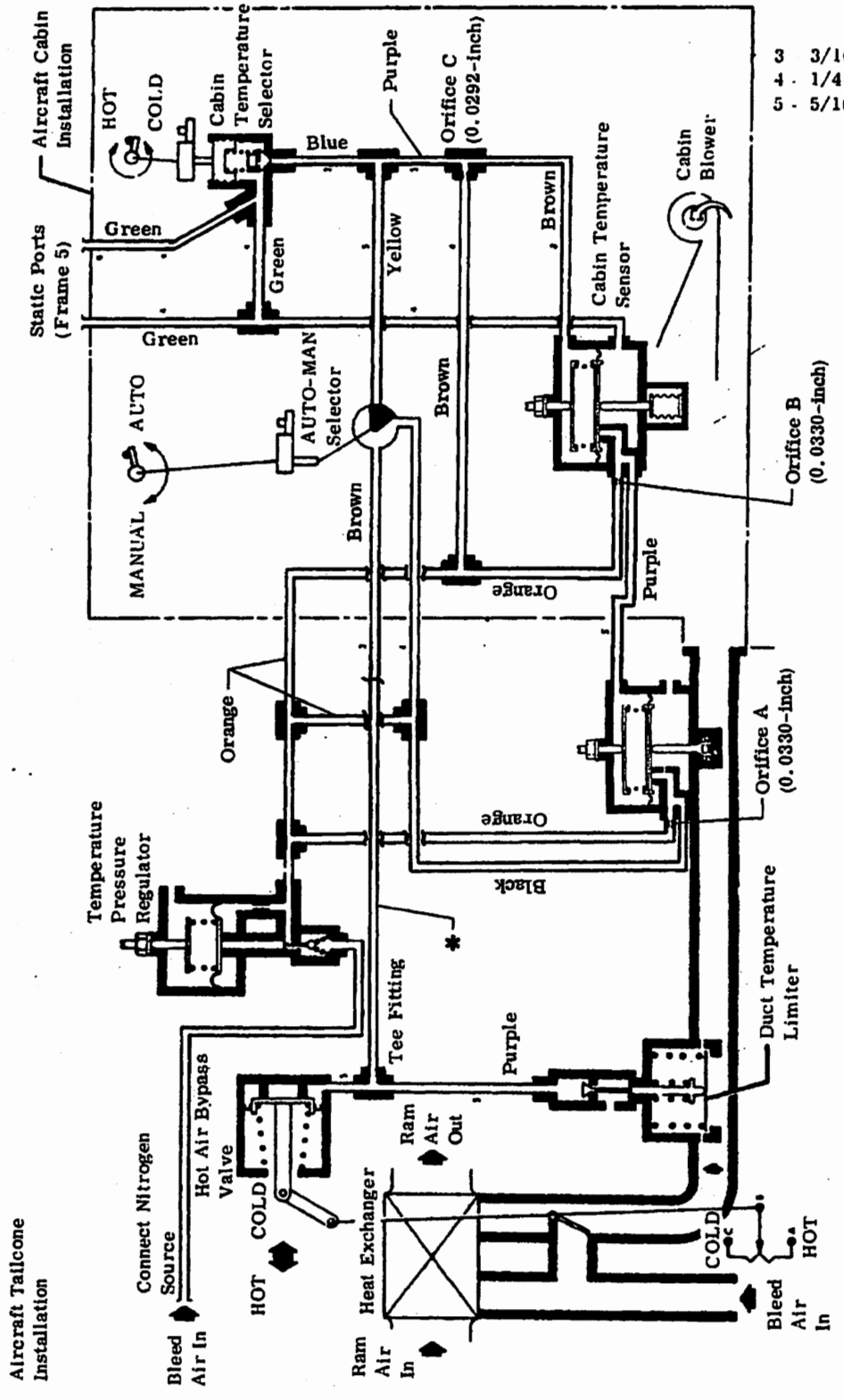
Temperature Control System Schematic
Figure 4 (Sheet 6 of 9)



Temperature Control System Schematic
Figure 4 (Sheet 7 of 9)



Temperature Control System Schematic
Figure 4 (Sheet 8 of 9)



Temperature Control System Schematic
Figure 4 (Sheet 9 of 9)

It must be noted that a slightly unbalanced condition will only dimly illuminate the indicator light and will not move the hot air bypass valve. The unbalanced condition must be of sufficient amplitude to overcome bypass valve motor inertia. As the amplitude of the unbalanced condition increases, the indicator lights will become brighter. When motor inertia is overcome, the indicator lights dim. In case of temperature control system malfunction, the high limit thermostat acts as a protective device. The thermostat removes power from the bridge circuit and completes a power circuit to the closed side of the hot air bypass valve.

C. On Aircraft 25-227 and Subsequent, the temperature control system is operated by a regulated pressure. The regulated pressure is controlled by the temperature sensor, the COLD-HOT Temperature Selector, the duct temperature sensor and duct temperature limiter which act as bleed-off regulators to modify the regulated pressure. The pressure in the temperature control system positions the hot air bypass valve to obtain the desired air flow temperature. The COLD-HOT Temperature Selector is used to vary the pressure in the system. With the AUTO-MAN Temperature Mode Selector set to AUTO and the COLD-HOT Temperature Selector set to COLD the temperature selector poppet valve opens and reduces the pressure to the cabin temperature sensor. The decreased pressure in the control chamber of the cabin temperature sensor opens the bleed path for the control pressure in the top chamber of the duct temperature sensor, and allows the duct temperature sensor to vent more of the hot air bypass valve control pressure to ambient. The decreased pressure allows the bypass valve to close and routes bleed air through the heat exchanger, then into the cabin at a lower temperature. When the temperature selector is set to HOT, the temperature selector poppet valve closes and raises the pressure in the top chamber of the cabin temperature sensor. The increased pressure in the control chamber of the cabin temperature sensor closes the bleed-off path and increases pressure in the top chamber of the duct temperature sensor which closes the bleed-off path and increases pressure to the bypass valve. The increased pressure allows the hot air bypass valve to open and bypass more hot air into the cabin distribution system. The cabin temperature sensor's blower blows cabin air across the sensor and causes the sensor to meter more or less pressure to ambient, depending on the temperature of the air. The temperature sensor blower will be inoperative when either the cool system or the auxiliary cabin heater system are being utilized. When either the Cool System Switch or the Auxiliary Heat Switch is set to ON, a control relay opens the ground circuit to the blower. When the AUTO-MAN Temperature Mode Selector is set to MAN, the cabin temperature sensor is removed from the system, and the pressure to the bypass valve is controlled directly by the temperature selector. Setting the temperature selector to cold, bleeds off a greater amount of the regulated pressure and allows the hot air bypass valve to route more bleed air through the heat exchanger. Setting the temperature selector to hot closes the bleed off path and increases the pressure at the hot air bypass valve. The valve opens and bypasses more bleed air directly into the cabin air distribution ducts.

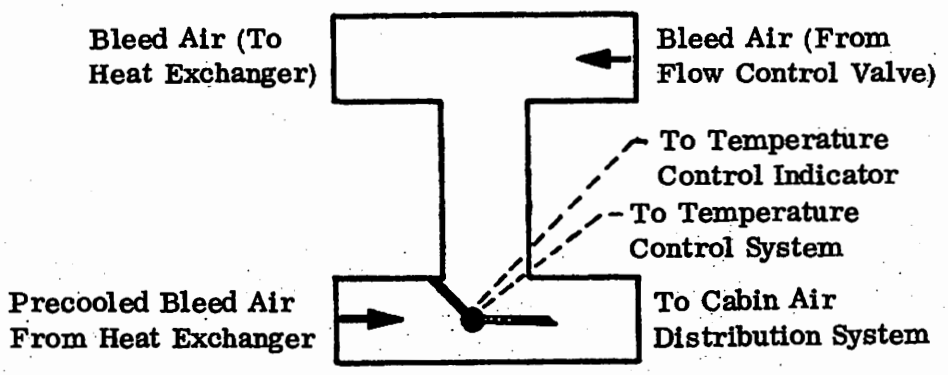
D. Component Operation

(1) The cabin temperature sensor blower motor draws sufficient air across the cabin temperature sensor thermistor(s) to obtain a representative cabin air temperature sampling. On Aircraft 25-061, 25-070 thru 25-226, the thermistor senses a change in air temperature and causes an imbalance in the temperature circuit bridge circuit. This imbalance repositions the hot air bypass valve. On Aircraft 25-227 and Subsequent, the temperature sensor meters more or less regulated pressure to ambient (depending on the air temperature across the sensor). These changes in pressure position the hot air bypass valve. The temperature sensor blower will be inoperative with the COOL SYS Switch or the AUX HEAT Switch set to ON.

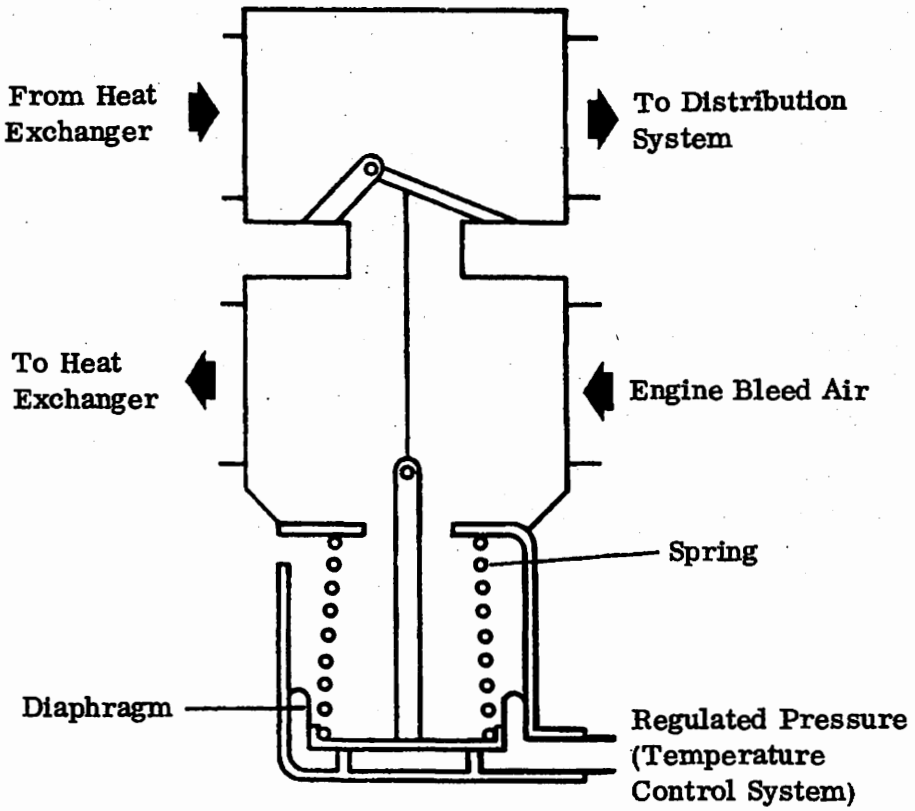
(2) On Aircraft 25-061, 25-070 thru 25-226, the duct temperature sensor senses the duct air temperature and provides a signal to the temperature control comparator circuit. On Aircraft 25-227 and Subsequent, the duct temperature sensor senses duct temperature and acts as a bleed-off regulator for the hot air bypass valve actuator pressure. The duct temperature sensor control pressure is supplied by the cabin temperature sensor.

(3) On Aircraft 25-227 and Subsequent, the duct temperature limiter is basically a poppet-type valve employed as a variable orifice and is actuated by a bimetal sensing element. If the duct temperature reaches the pre-set temperature limit (approximately 350° F) the bimetal sensing element becomes concave and moves the poppet off its seat and bleeds regulated pressure to ambient. This repositions the hot air bypass valve for a cooler air flow.

(4) On Aircraft 25-061, 25-070 thru 25-226, the hot air bypass valve (See figure 5.) consists basically of three ducts: one directs engine bleed air to the heat exchanger and one directs precooled engine bleed air to the distribution system and incorporates an actuator with a butterfly-type valve. The third duct connects the other two ducts. When a higher temperature is called for, the butterfly valve opens and higher temperature bleed air flows directly into the air distribution system, bypassing the heat exchanger. The bypass valve actuator is electrically operated by the temperature control circuit. A potentiometer, an integral part of the bypass valve and the temperature control circuit, provide a temperature control circuit balancing signal. A temperature control indicator, on the copilot's subpanel, indicates the position of the hot air bypass valve.



Aircraft 25-061, 25-070 thru 25-226



SHOWN IN NORMALLY CLOSED POSITION

Aircraft 25-227 and Subsequent

Hot Air Bypass Valve Schematic
Figure 5

On Aircraft 25-227 and Subsequent, the hot air bypass valve consists basically of three ducts: one directs engine bleed air to the heat exchanger and one directs precooled engine bleed air to the distribution system and incorporates a pressure-actuated butterfly valve. The third duct connects the other two ducts. When a higher temperature is called for, the butterfly valve opens and higher temperature bleed air flows directly into the air distribution system, bypassing the heat exchanger. The bypass valve is operated by a regulated pressure from the temperature control system. Normally (no pressure applied) the valve is held closed by spring pressure. The temperature controls provide a regulated pressure which overrides the valve spring pressure and positions the valve to bypass the required amount of hot air to maintain the cabin airflow at the desired level. A temperature control indicator, on the copilot's subpanel, indicates the position of the hot air bypass valve.

(5) The hot air bypass valve indicator is a semi-circular reading scale graduated from C to O in 1/4-inch increments. The indicator is electrically controlled by an externally mounted potentiometer, mechanically connected to the hot air bypass valve shaft.

TEMPERATURE CONTROLS - TROUBLE SHOOTING

1. Trouble Shooting (See figure 101.)

NOTE: Trouble shooting of the temperature control system consists basically of checking pressure levels at specified locations, replacing defective components, repairing leaking air line connections, cleaning obstructed in-line orifices and cleaning obstructed atmospheric vents.

A. Tools and Equipment

NAME	PART NUMBER	MANUFACTURER
Pressure Gage (3) 0 to 50 psig (0.5 psi increments)		Commercially Available
Nitrogen Source (Reg to 50 psig)		Commercially Available

B. Set up Trouble Shooting Test Procedure as follows:

(1) Install pressure gages as shown in figure 101.
(2) Connect regulated nitrogen source to temperature pressure regulator.
(3) Rotate Cabin Temperature Selector knob counterclockwise to full COLD.
(4) Set MAN-AUTO Temperature Mode Selector to MAN.
(5) Adjust nitrogen source to obtain 45 (±5) psig.
(6) Record pressure gage indications. Indications shall be as follows:
Gage No. 1: 14 to 17 psig
Gage No. 2: 0.5 to 2.0 psig
Gage No. 3: 1.0 to 3.0 psig
(7) If pressures are not within limits specified, the following troubles may be suspected.
(a) If gage No. 1 indication is not within limits, replace temperature control system pressure regulator.
(b) If gage No. 2 indication exceeds 2.0 psig, check for obstructed atmospheric vent from Cabin Temperature Selector. If vent is not obstructed, check for missing orifice C. If orifice is not missing, replace Cabin Temperature Selector.

(c) If gage No. 2 indication is less than 0.5 psig, check for obstructed orifice C. If orifice is not obstructed, check for connecting air line leakage.

(8) Rotate Cabin Temperaure Selector knob clockwise to full HOT.

(9) Record pressure gage indications. Indications shall be as follows:
Gage No. 1: 14 to 17 psig
Gage No. 2: 11 to 14 psig
Gage No. 3: 11 to 14 psig

(10) If pressures are not within limits specified, the following troubles may be suspected.

(a) If pressure at gage No. 2 is less than 11 psig, check for connecting air line leakage from the cabin temperature sensor to cabin temperature selector and from hot air bypass valve to duct temperature limiter. If no leakage is evident, check for obstructed orifice C.

(b) If gage No. 2 indication exceeds 14 psig, check for missing orifice C. Replace orificed tee assembly if orifice is missing.

(11) Rotate cabin temperature selector knob counterclockwise to full COLD.

(12) Set MAN-AUTO Temperature Mode Selector to AUTO.

(13) Record pressure gage indications. Indications shall be as follows:
Gage No. 1: 14 to 17 psig
Gage No. 2: 1.0 to 3.0 psig
Gage No. 3: 1.0 to 3.0 psig

(14) If pressures are not within limits specified, the following troubles may be suspected.

(a) If gage No. 2 indication exceeds 3.0 psig, check for missing orifice A. If orifice is not missing, check for obstructed duct temperature sensor vent. If vent is not obstructed, but sensor is not venting, check gage No. 3 pressure. If pressure is within limits, replace sensor.

(b) If gage No. 2 indication is less than 1.0 psig, check for obstructed orifice A. If orifice is not obstructed, check for connecting air line leakage.

(c) If gage No. 3 indication exceeds 3.0 psig, check for obstructed atmospheric vent from cabin temperature sensor. If vent is not obstructed, check for missing orifice B. If orifice is not missing, replace cabin temperature sensor.

(d) If gage No. 3 indication is less than 1.0 psig, check for obstructed orifice B. If orifice is not obstructed, check for connecting air line leakage.

(15) Rotate cabin temperature selector knob clockwise to full HOT.

(16) Record pressure gage indications. Indications shall be as follows:
Gage No. 1: 14 to 17 psig
Gage No. 2: 11 to 14 psig
Gage No. 3: 11 to 14 psig

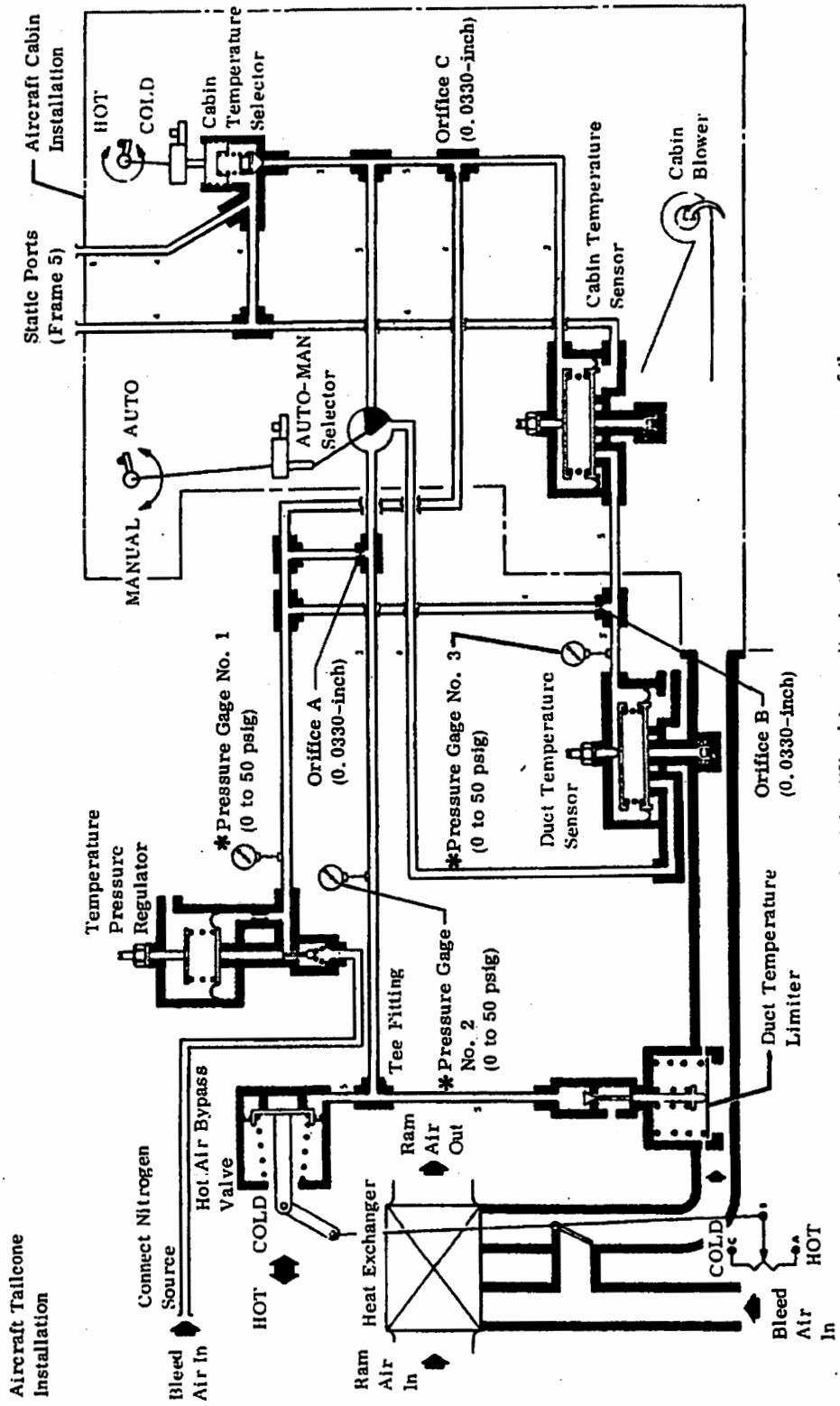
(17) If pressures are not within limits specified, the following troubles may be suspected.

(a) If gage No. 2 indication is less than 11 psig, check for connecting air line leakage from duct temperature sensor to MAN-AUTO Selector. If no leakage is evident and gage No. 3 pressure is within limits, replace duct temperature sensor.

(b) If gage No. 3 indication is less than 11 psig, check for connecting air line leakage from cabin temperature sensor to duct temperature sensor.

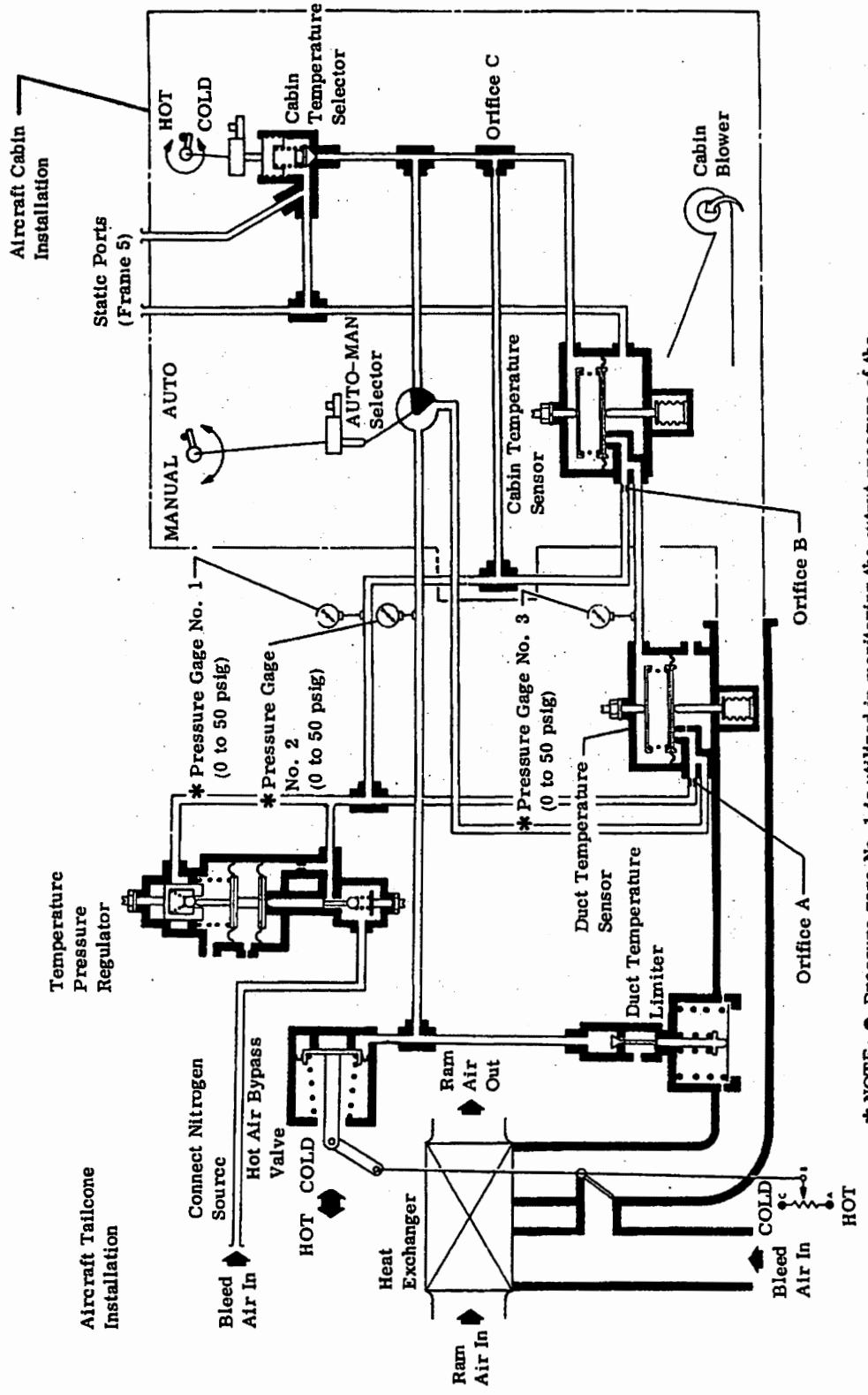
(18) Disconnect nitrogen source from temperature control system pressure regulator.

(19) Remove pressure gages and restore system to normal operation.



* NOTE:
- Pressure gage No. 1 is utilized in monitoring the output pressure of the Temperature Pressure Regulator.
- Pressure gage No. 2 is utilized in monitoring the pressure between the Hot Air Bypass Valve, Duct Temperature Limiter and the AUTO-MAN Selector.
- Pressure gage No. 3 is utilized in monitoring the pressure signal from the Cabin Temperature Sensor to the Duct Temperature Sensor.

Temperature Control System Test Schematic
Figure 101 (Sheet 1 of 2)



* NOTE:
- Pressure gage No. 1 is utilized in monitoring the output pressure of the Temperature Pressure Regulator.
- Pressure gage No. 2 is utilized in monitoring the pressure between the Hot Air Bypass Valve, Duct Temperature Limiter and the AUTO-MAN Selector.
- Pressure gage No. 3 is utilized in monitoring the pressure signal from the Cabin Temperature Sensor to the Duct Temperature Sensor.

Temperature Control System Test Schematic
Figure 101 (Sheet 2 of 2)

TEMPERATURE CONTROLS - MAINTENANCE PRACTICES

1. Inspection/Check

A. On Aircraft 25-061, 25-070 thru 25-226, the aircraft temperature control system may be operationally checked prior to engine runup as follows:

NOTE: On Aircraft 25-061, 25-070 thru 25-074 not modified per AAK 71-3, Hot Air Bypass Valve Position Indicator Kit, lower tailcone access door and monitor index pointer on the bypass valve.

(1) Set Battery Switch(es) on.
(2) Rotate cabin temperature selector knob counterclockwise to MAN.
(3) Hold MAN-HOT-COLD Switch to HOT until hot air bypass valve fully opens. Bypass valve position indicator will move to O.
(4) Hold MAN-HOT-COLD Switch to COLD until bypass valve fully closes. Indicator will move to C in approximately 35 to 55 seconds.
(5) Rotate cabin temperature selector knob clockwise to AUTO, then full clockwise to HOT. Bypass valve shall fully open (bypass valve position indicator moves to O).
(6) Rotate cabin temperature selector knob counterclockwise to colder position. Avoid positioning selector switch to MAN. Bypass valve shall fully close (bypass valve position indicator moves to C).
(7) A checkout in AUTO will function correctly with temperatures in area of cabin temperature sensors ranging between 70° and 90° F. At temperatures above or below this range, it is possible that bypass valve will move in one direction only.
(8) Set Battery Switch(es) off.

B. On Aircraft 25-227 and Subsequent, the temperature control system may be operationally checked as follows:

(1) Set Battery Switches on and start one engine.
(2) Set AUTO-MAN Temperature Mode Selector knob to MAN.
(3) Rotate cabin temperature selector knob clockwise to HOT until hot air bypass valve fully opens. Temperature control indicator shall move to OPEN.
(4) Rotate cabin temperature selector knob counterclockwise to COLD until bypass valve fully closes. Temperature control indicator will move to CLOSED in approximately 5 seconds.
(5) Set AUTO-MAN Temperature Mode Selector knob to AUTO.
(6) Rotate cabin temperature selector knob to HOT. Bypass valve shall fully open (temperature control indicator moves to OPEN).

(7) Rotate cabin temperature selector knob counterclockwise to COLD. Bypass valve shall fully close (temperature control indicator moves to CLOSED).

NOTE: The checkout in AUTO position will function correctly with temperatures in the area of the cabin temperature sensors between 79° and 90°F. At temperatures above or below this range, it is possible that the hot air bypass valve will move in one direction only.

(8) Shut down engine.
(9) Set Battery Switches off.

2. Adjustment/Test

NOTE: On Aircraft 25-227 and Subsequent, no adjustment of the temperature controls is allowed.

A. If cabin temperature cannot be effectively controlled in the automatic mode, but functions properly in manual mode, an adjustment of the temperature control unit may be required. All adjustments are made at the temperature control unit and must be accomplished in flight. Three holes are provided in the temperature control unit for the indicator lights and the potentiometer. These lights (one red and one green) are illuminated when the bridge circuit or comparator circuit is in an unbalanced condition. The red indicator light, when illuminated, indicates the bridge circuit is unbalanced in a cooling direction. It must be noted that a slight unbalanced condition will only dimly illuminate the indicator light and will not move the hot air bypass valve. The unbalanced condition must be of sufficient amplitude to overcome bypass valve motor inertia. As the amplitude of the unbalanced condition increases, the indicator lights will become brighter. When motor inertia is overcome the indicator lights dim. Proceed as follows:

NOTE: The following procedure is for increasing the cabin heat. If a cooler cabin is desired, follow the same procedure except turn the potentiometer counterclockwise and monitor the green indicator light.

On Aircraft 25-061, 25-070 thru 25-094, prior to temperature control unit adjustment, assure that R150 (wire-wound variable resistor) is set to 180 (±5) ohms. Measure resistance from center of R150 to Pin B of receptacle J111.

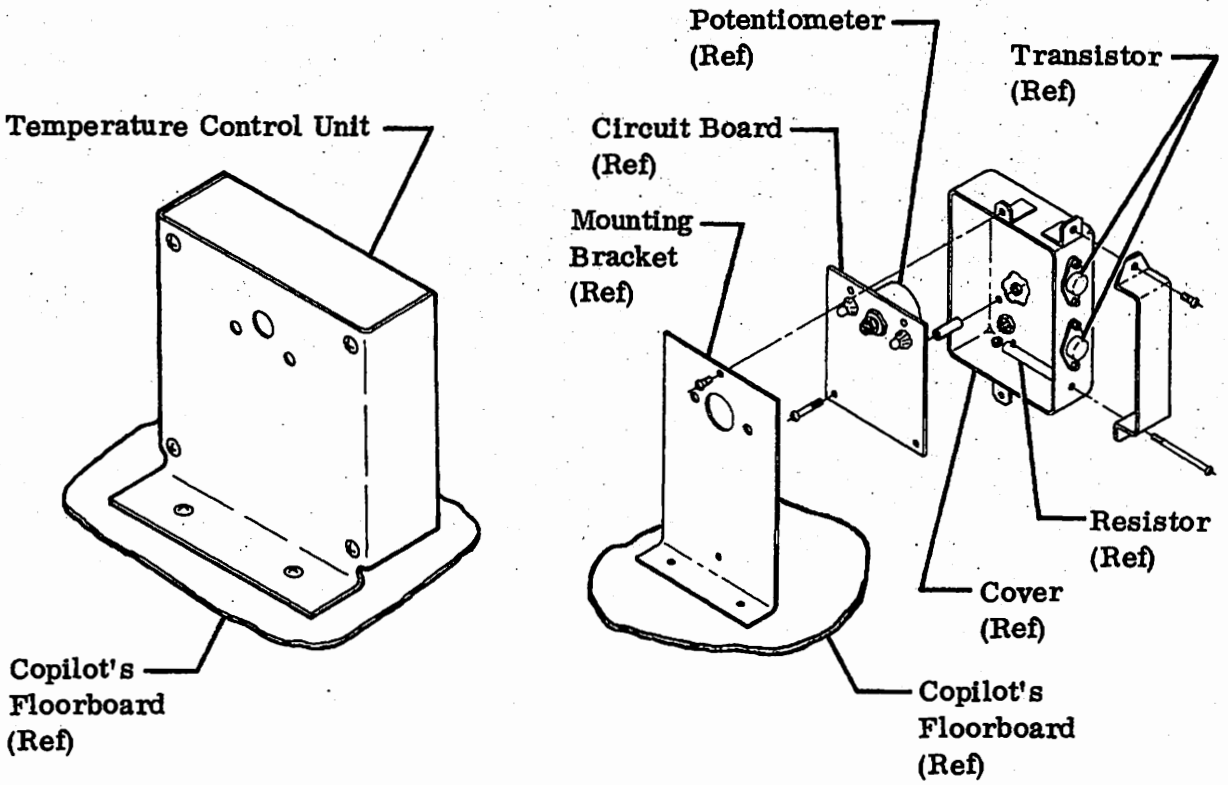
(1) Gain access to temperature control unit.
(2) Turn cabin temperature selector on instrument panel to its mid-range.

NOTE: Either indicator light may be illuminated depending on polarity of unbalance condition in comparator circuit.

(3) Turn potentiometer slowly clockwise. Red indicator light will brighten then dim. This indicates the bypass valve is opening. When the bridge circuit is rebalanced, the red indicator light will extinguish.
(4) Turn cabin temperature selector clockwise and check for desired temperature control. Allow sufficient time for cabin temperature to stabilize.
(5) Repeat procedure as necessary until desired temperature control can be maintained.

TEMPERATURE CONTROL UNIT - MAINTENANCE PRACTICES

1. Removal/Installation
   - A. Remove Temperature Control Unit (See figure 201.)
     - (1) Disconnect electrical connector from temperature control unit.
     - (2) Remove attaching parts and control unit from aircraft.
   - B. Install Temperature Control Unit. (See figure 201.)
     - (1) Position temperature control unit in aircraft and secure with attaching parts.
     - (2) Connect electrical connector.



Aircraft 25-061 thru 25-089, 25-091 thru 25-094

Aircraft 25-090, 25-095 thru 25-226

Temperature Control Unit Installation
Figure 201

13-73A-1
9-100C

CABIN TEMPERATURE SENSOR - MAINTENANCE PRACTICES

1. Removal/Installation

CAUTION: WHEN NECESSARY TO DISCONNECT AN ELECTRICAL BONDING JUMPER, ENSURE THAT IT IS CORRECTLY REINSTALLED. ELECTRICAL BONDING INTEGRITY IS ESSENTIAL TO THE PROPER OPERATION AND SAFETY OF AIRCRAFT ELECTRICAL AND AVIONIC EQUIPMENT.

A. Remove Cabin Temperature Sensor (Aircraft 25-061, 25-070 thru 25-226) (See figures 201 and 202.)
   (1) Disconnect electrical connector from cabin temperature sensor located below copilot's seat.
   (2) Remove attaching parts and sensor.

B. Remove Cabin Temperature Sensor (Aircraft 25-227 and Subsequent) (See figures 201 and 202.)
   (1) Remove appropriate cabin upper center upholstery panel, providing access to cabin temperature sensor located on forward side of frame 13D.
   (2) Disconnect, cap off, and identify pneumatic hoses and fittings from spacer.
   (3) Disconnect electrical connector from cabin temperature sensor blower motor.
   (4) On Aircraft 25-257 and Subsequent, disconnect bonding jumper from cabin temperature sensor housing to frame 13D.
   (5) Remove attaching parts and sensor.

C. Install Cabin Temperature Sensor (Aircraft 25-061, 25-070 thru 25-226)
   (1) Position cabin temperature sensor at its appropriate location on cabin floorboard beneath copilot's seat and secure with attaching parts.
   (2) Connect electrical connector to sensor.

D. Install Cabin Temperature Sensor (Aircraft 25-227 and Subsequent)
   (1) Position cabin temperature sensor at its appropriate location on frame 13D, and secure with attaching parts.
   (2) On Aircraft 25-257 and Subsequent, connect electrical bonding jumper from cabin temperature sensor housing to frame 13D.
   (3) Connect electrical connector to cabin temperature sensor blower motor.
   (4) Remove caps, identify and connect pneumatic hoses and fittings to sensor.
   (5) Install cabin upper center upholstery panel.

2. Adjustment/Test

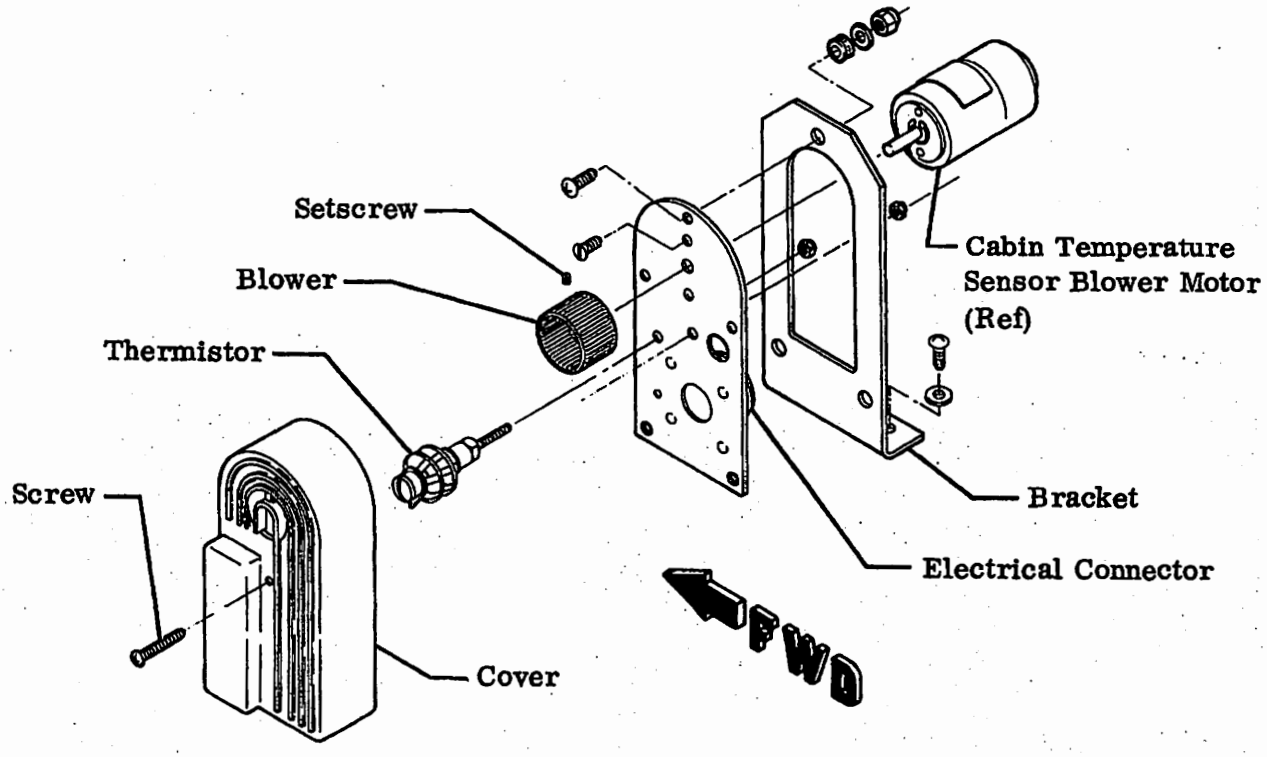
A. On Aircraft 25-061, 25-070 thru 25-226, to insure proper temperature control operation, an electrical check should be made on the temperature sensor periodically or when difficulty is experienced in the control system. Perform check as follows:

(1) Using a Wheatstone bridge or equivalent (low current type to keep self-heating to a minimum), measure resistance between pins C and D and between A and B. Resistance shall be 220 (±6) ohms. The resistance may slowly decrease. This is due to the potential applied with the resistance measuring device.

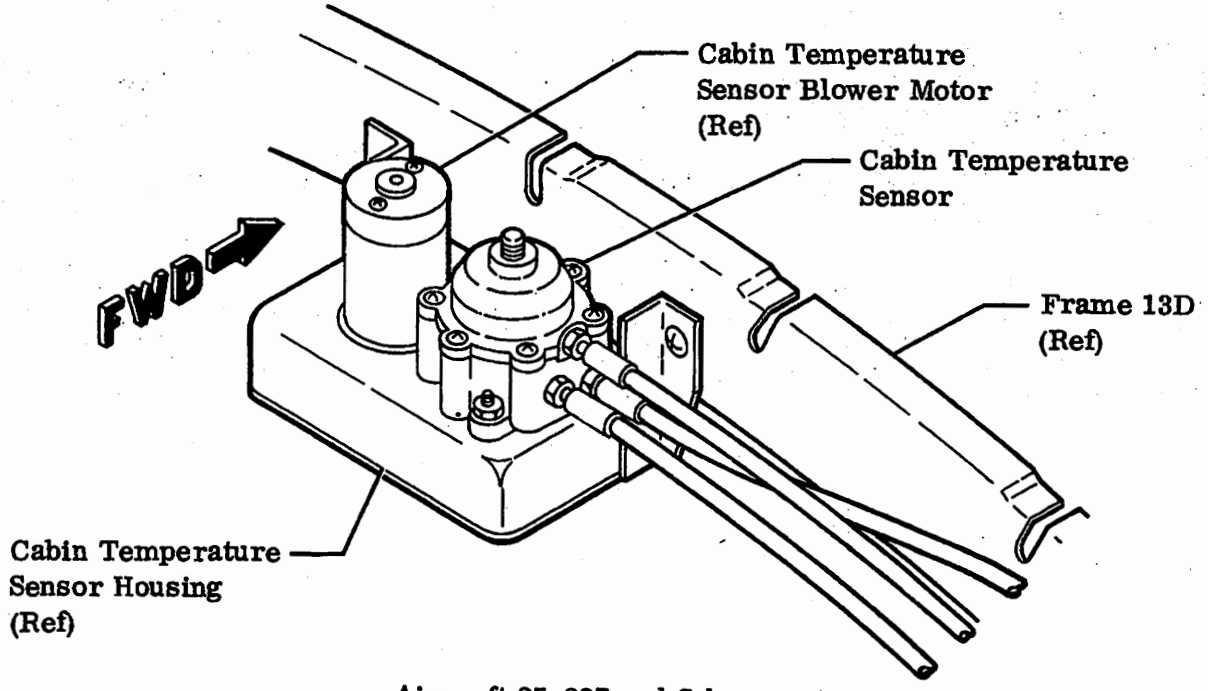
(2) Check resistance between each pin and the connector shell at 500 vdc. Minimum resistance shall be 5 megahoms.

3. Cleaning/Painting

A. On Aircraft 25-061, 25-070 thru 25-226, to insure proper temperature control operation, the unit should be removed and cleaned periodically. Clean blower in a mild detergent solution and dry with compressed air. Clean thermistor with a clean, dry, lint-free cloth.



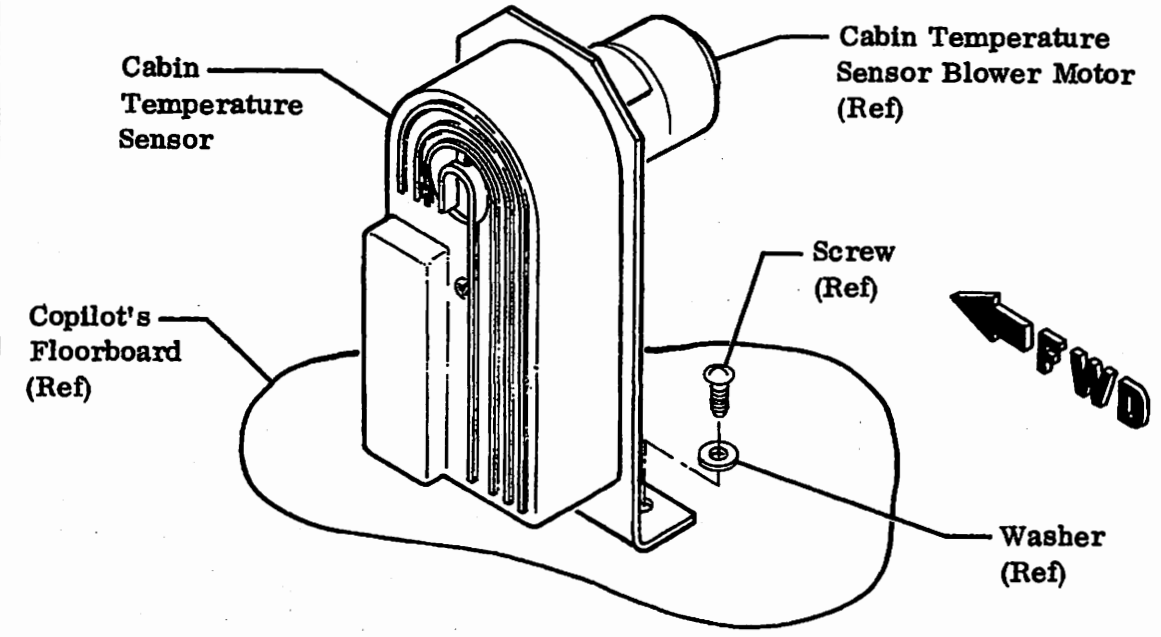
Aircraft 25-061, 25-070 thru 25-226



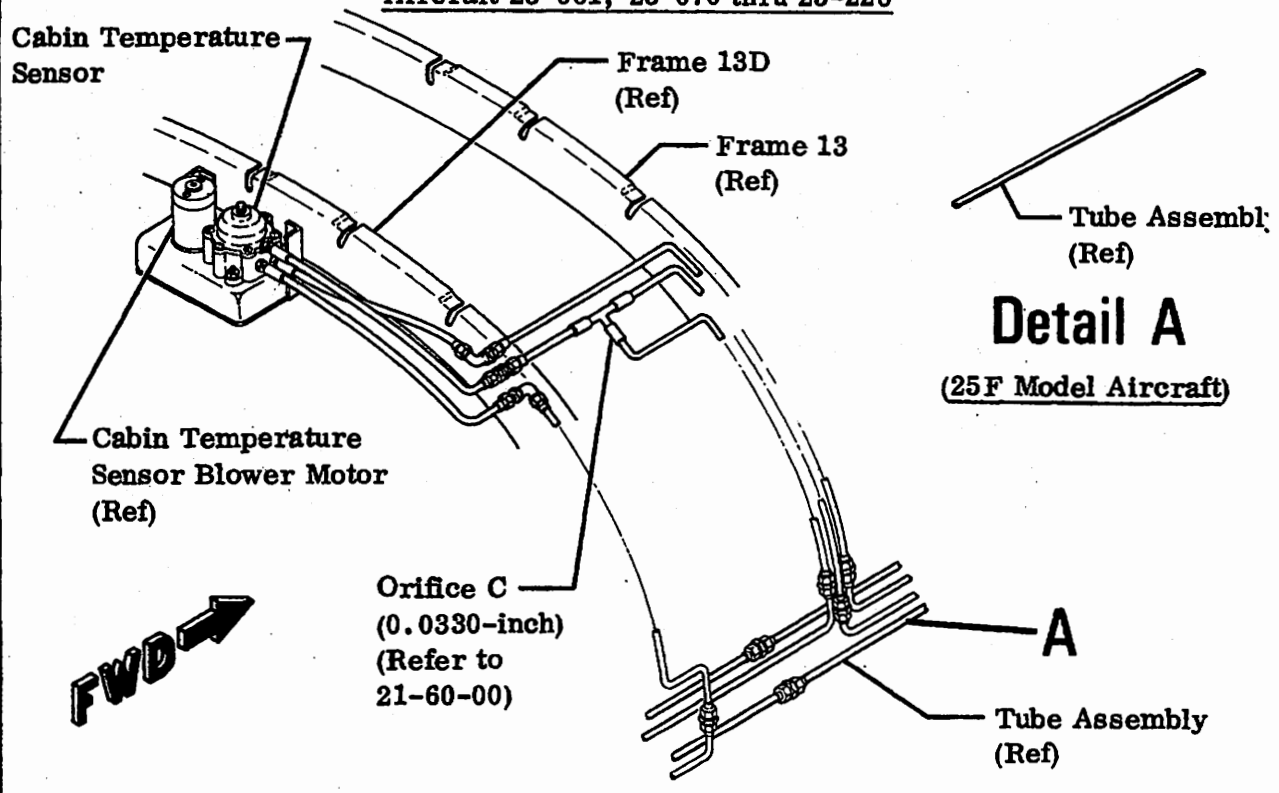
Aircraft 25-227 and Subsequent

Typical Cabin Temperature Sensor
Figure 201

13-43B-1
13-98C



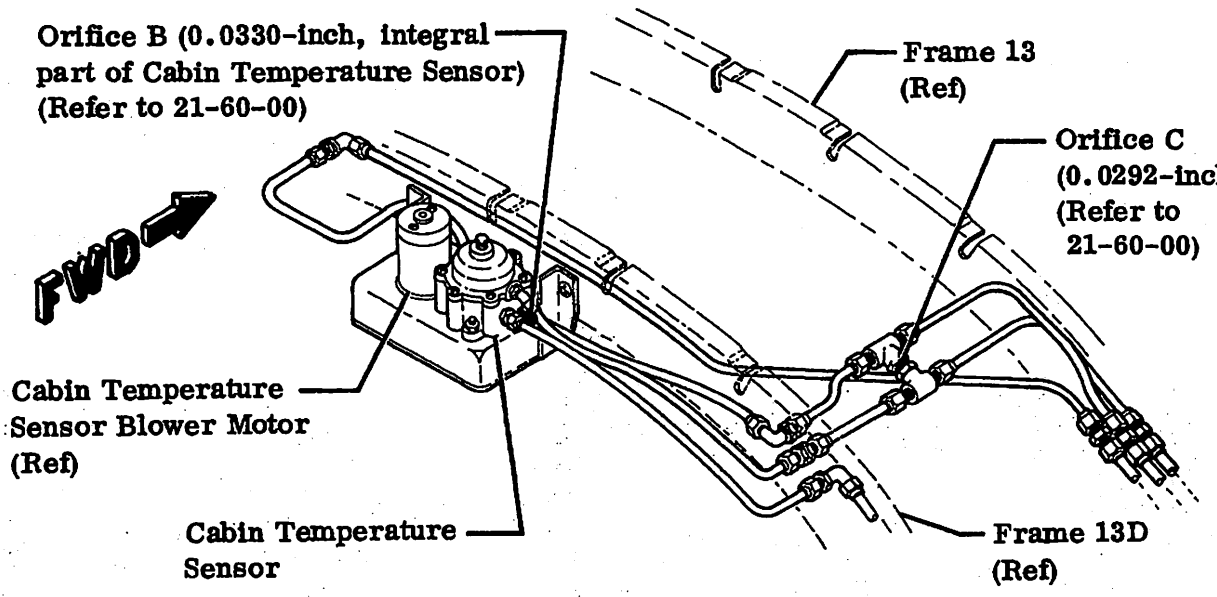
Aircraft 25-061, 25-070 thru 25-226



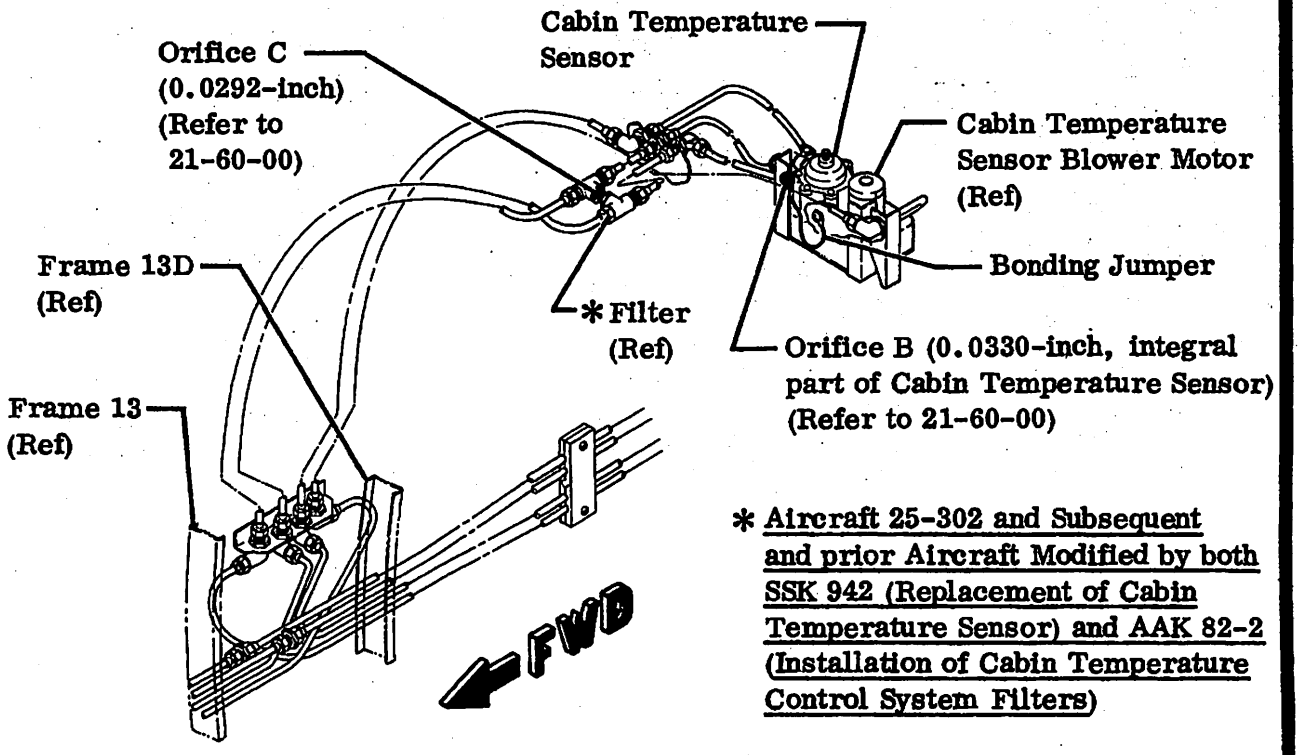
Aircraft 25-227 thru 25-256, not Modified per SSK 942 (Replacement of Cabin Temperature Sensor)

Cabin Temperature Sensor and Plumbing Installation
Figure 202 (Sheet 1 of 2)

13-43B-1
13-98B
13-117B-1



Aircraft 25-227 thru 25-256, Modified per SSK 942
(Replacement of Cabin Temperature Sensor)



* Aircraft 25-302 and Subsequent and prior Aircraft Modified by both SSK 942 (Replacement of Cabin Temperature Sensor) and AAK 82-2 (Installation of Cabin Temperature Control System Filters)

Aircraft 25-257 and Subsequent

Cabin Temperature Sensor and Plumbing Installation
Figure 202 (Sheet 2 of 2)

13-98B-1
13-119C-2

CABIN SKIN TEMPERATURE SENSOR - MAINTENANCE PRACTICES

1. Removal/Installation

A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following items.

NAME	PART NUMBER	MANUFACTURER	USE
Adhesive	Delta Bond No. 152	Wakefield Engr. Wakefield, Mass.	Bonding sensor to skin.
Stafome	AA 1802	Available Gates Learjet Spares Dept.	Refoaming inner surface of skin.
Methyl Ethyl Ketone (MEK)		Commercially Available	Cleaning inner surface of skin.

B. Remove Cabin Skin Temperature Sensor (See figure 201.)

(1) Gain access to skin temperature sensor installation and remove foam from around sensor.

(2) Disconnect skin temperature sensor wiring from cabin temperature sensor connector.

(3) Break bond and remove skin temperature sensor from aircraft.

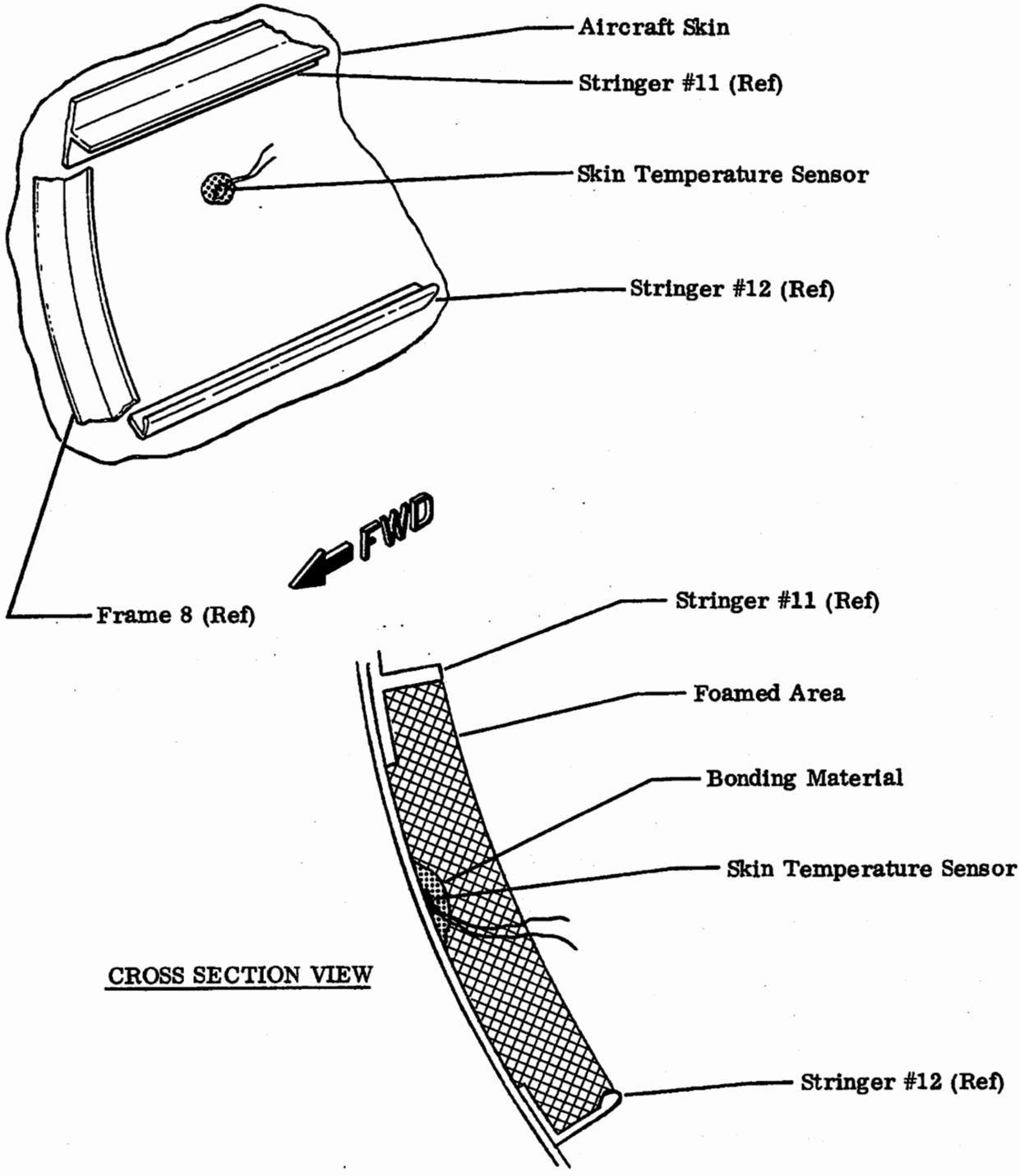
C. Install Cabin Skin Temperature Sensor (See figure 201.)

(1) Clean area where skin temperature sensor is to be installed with MEK.

(2) Bond temperature sensor with negative side to skin surface using Delta Bond No. 152 or equivalent. Refer to manufacturer's instructions for proper cure time. Area of bond material to be approximately 1.50 inch diameter by 0.50 inch thick.

(3) Connect electrical wiring to cabin temperature sensor connector.

(4) Refoam area around skin temperature sensor. Refer to manufacturer's instructions for application.



Cabin Skin Temperature Sensor Installation
Figure 201

DUCT TEMPERATURE SENSOR - MAINTENANCE PRACTICES

NOTE: When removing/installing duct temperature sensor or pneumatic lines or hoses, ensure that lines or hoses do not become kinked or twisted.

1. Removal/Installation

A. Remove Duct Temperature Sensor (Aircraft 25-061, 25-067 thru 25-226) (See figure 201.)

(1) Remove electrical power from aircraft.
(2) Lower tailcone access door.
(3) Disconnect electrical connector from duct temperature sensor.
(4) Remove sensor from precooled air duct.

B. Remove Duct Temperature Sensor (Aircraft 25-227 and Subsequent) (See figure 201.)

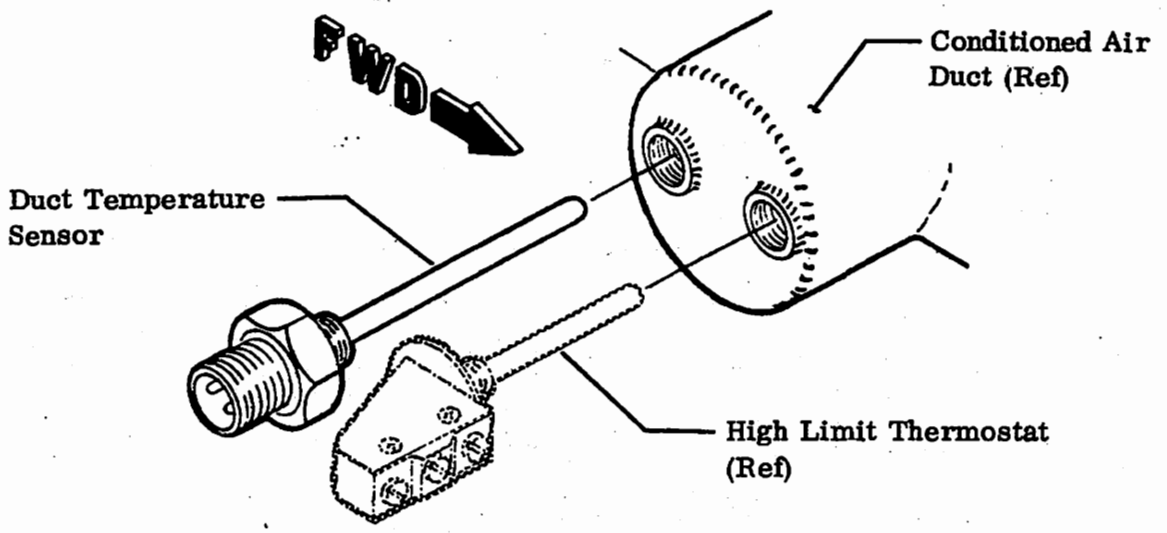
(1) Remove electrical power from aircraft.
(2) Lower tailcone access door.
(3) Disconnect and tag tubing from duct temperature sensor. Cap all exposed openings.
(4) Remove attaching parts and sensor from precooled air duct.

C. Install Duct Temperature Sensor (Aircraft 25-061, 25-067 thru 25-226) (See figure 201.)

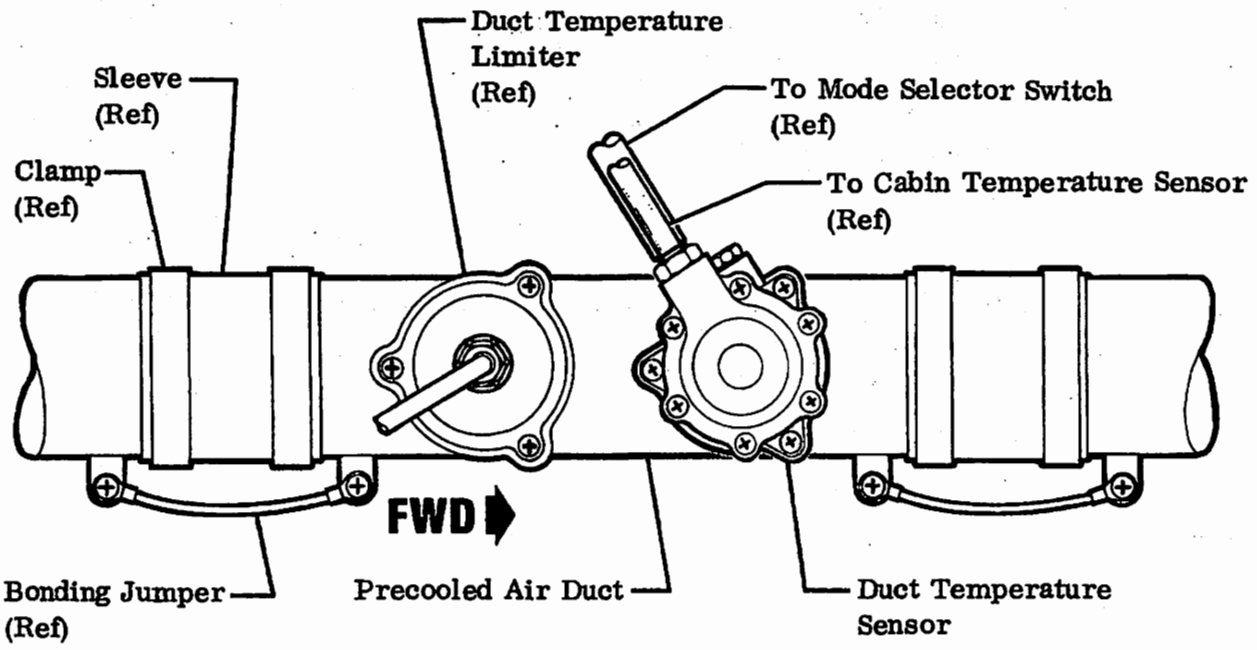
(1) Install duct temperature sensor in precooled air duct.
(2) Connect electrical connector to sensor.
(3) Raise and secure tailcone access door.
(4) Restore electrical power to aircraft.

D. Install Duct Temperature Sensor (Aircraft 25-227 and Subsequent) (See figure 201.)

(1) Install duct temperature sensor in precooled air duct and secure with attaching parts.
(2) Remove caps from openings; identify and connect tubes to sensor.
(3) Raise and secure tailcone access door.
(4) Restore electrical power to aircraft.



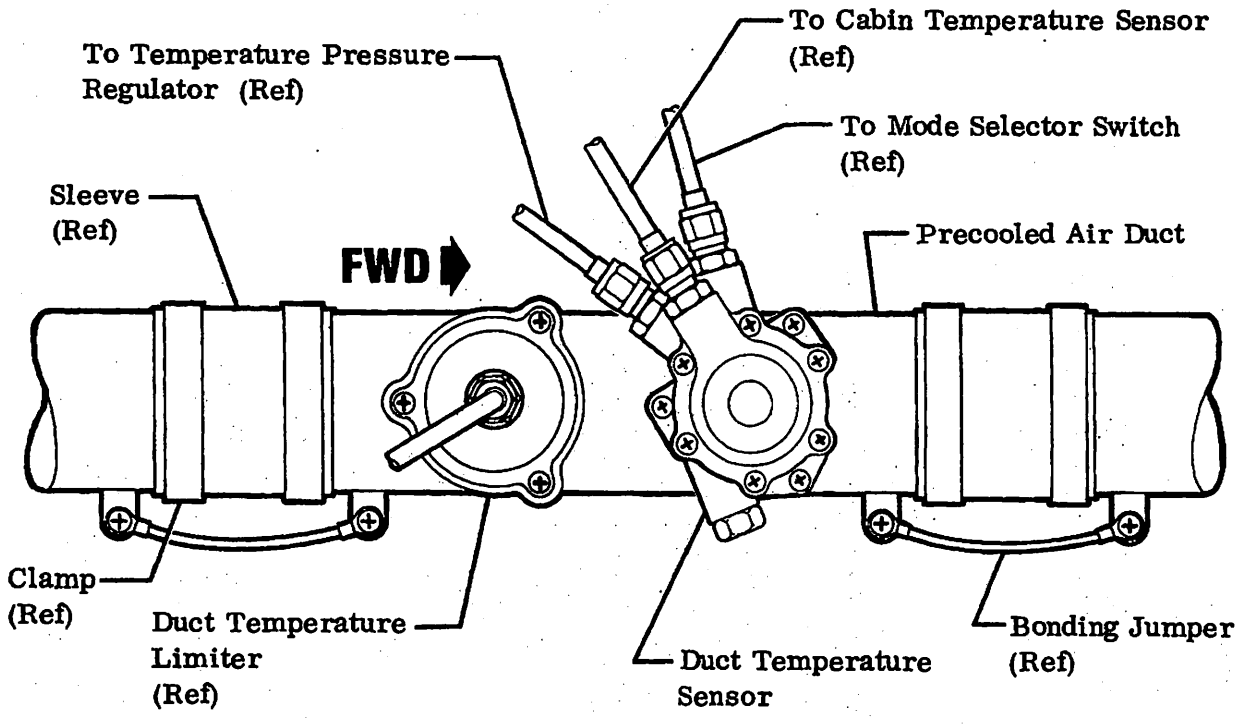
Aircraft 25-061, 25-070 thru 25-226



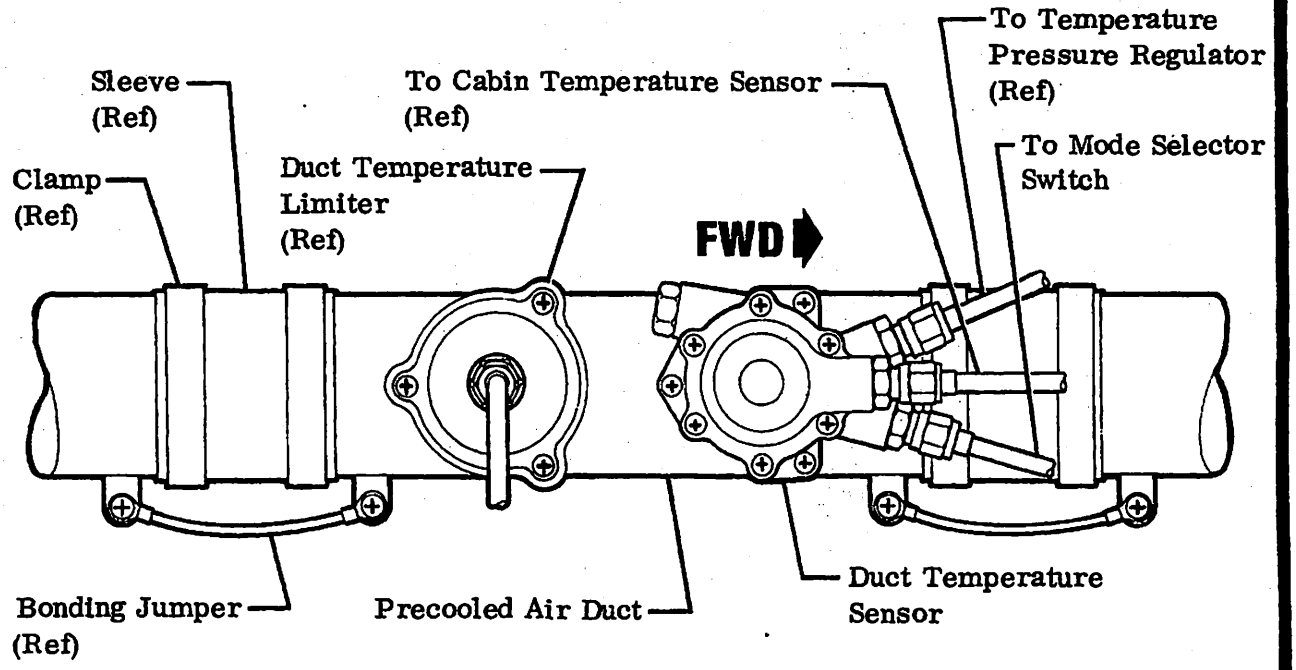
Aircraft 25-227 thru 25-256 not Modified per SSK 943
(Replacement of Duct Temperature Sensor and Limiter)

Duct Temperature Sensor Installation
Figure 201 (Sheet 1 of 2)

13-125



Aircraft 25-227 thru 25-256 modified per SSK 943
(Replacement of Duct Temperature Sensor and Limiter)



Aircraft 25-257 and Subsequent

Duct Temperature Sensor Installation
Figure 201 (Sheet 2 of 2)

13-125

HIGH LIMIT THERMOSTAT - MAINTENANCE PRACTICES

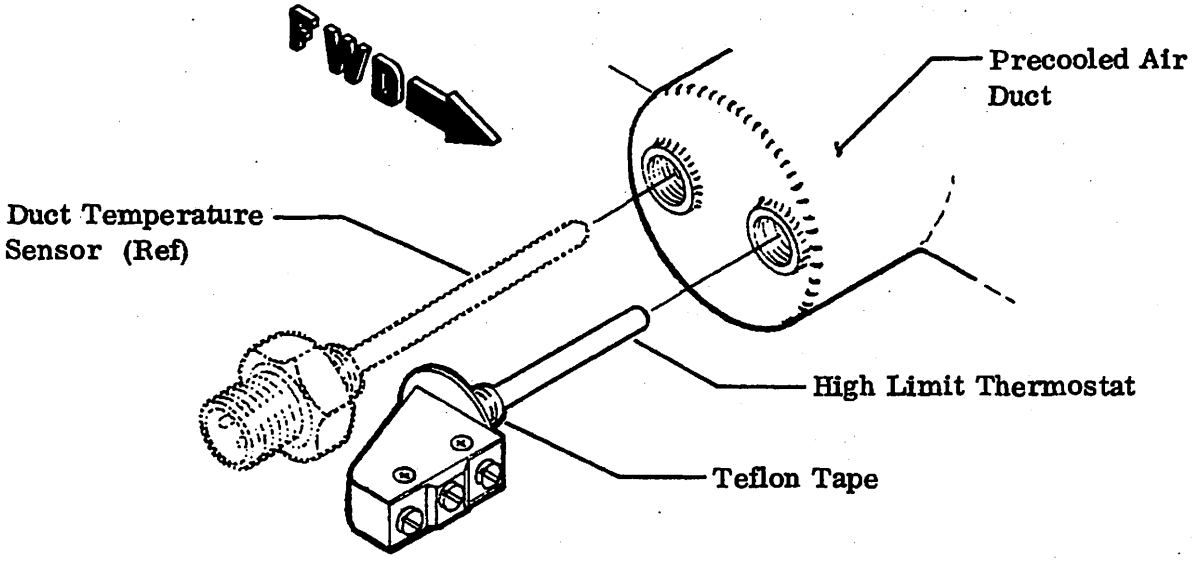
1. Removal/Installation

A. Remove High Limit Thermostat (Aircraft 25-061, 25-067 thru 25-226) (See figure 201.)

(1) Remove electrical power from aircraft.
(2) Lower tailcone access door.
(3) Disconnect electrical connector from high limit thermostat located in precooled air duct.
(4) Remove thermostat from aircraft.

B. Install High Limit Thermostat (Aircraft 25-061, 25-067 thru 25-226) (See figure 201.)

(1) Apply Teflon tape to threads of high limit thermostat.
(2) Install thermostat in precooled air duct.
(3) Connect electrical connector to thermostat.
(4) Raise and secure tailcone access door.
(5) Restore electrical power to aircraft.



Aircraft 25-061, 25-070 thru 25-226

High Limit Thermostat Installation
Figure 201

DUCT TEMPERATURE LIMITER - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Duct Temperature Limiter (Aircraft 25-227 and Subsequent) (See figure 201.)

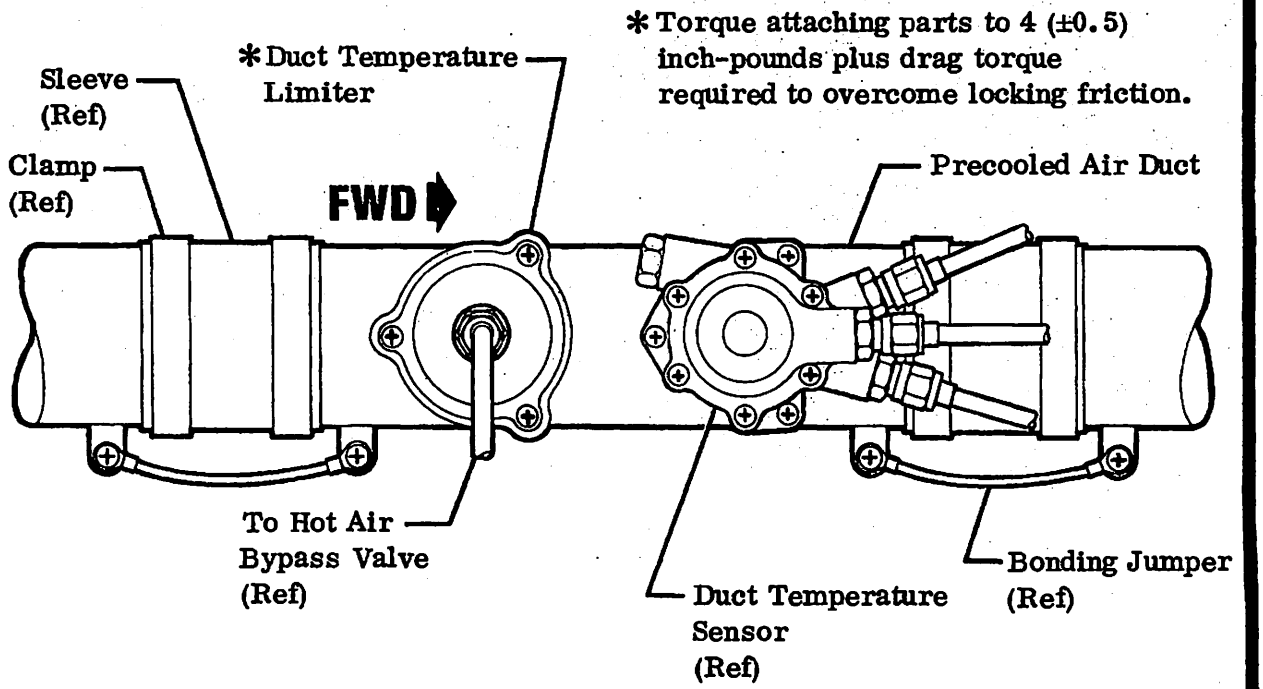
(1) Remove electrical power from aircraft.
(2) Lower tailcone access door.
(3) Disconnect tubing from duct temperature limiter. Cap exposed openings.
(4) Remove attaching parts and limiter from precooled air duct.

B. Install Duct Temperature Limiter (Aircraft 25-227 and Subsequent) (See figure 201.)

(1) Install duct temperature limiter in precooled air duct and secure with attaching parts.

NOTE: Torque attaching parts to 4 (±0.5) inch-pounds plus drag torque required to overcome locking friction.

(2) Remove caps from openings; connect tubing to duct temperature limiter.
(3) Raise and secure tailcone access door.
(4) Restore electrical power to aircraft.



Aircraft 25-257 and Subsequent Shown

Typical Duct Temperature Limiter Installation
Figure 201

13-125

HOT AIR BYPASS VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

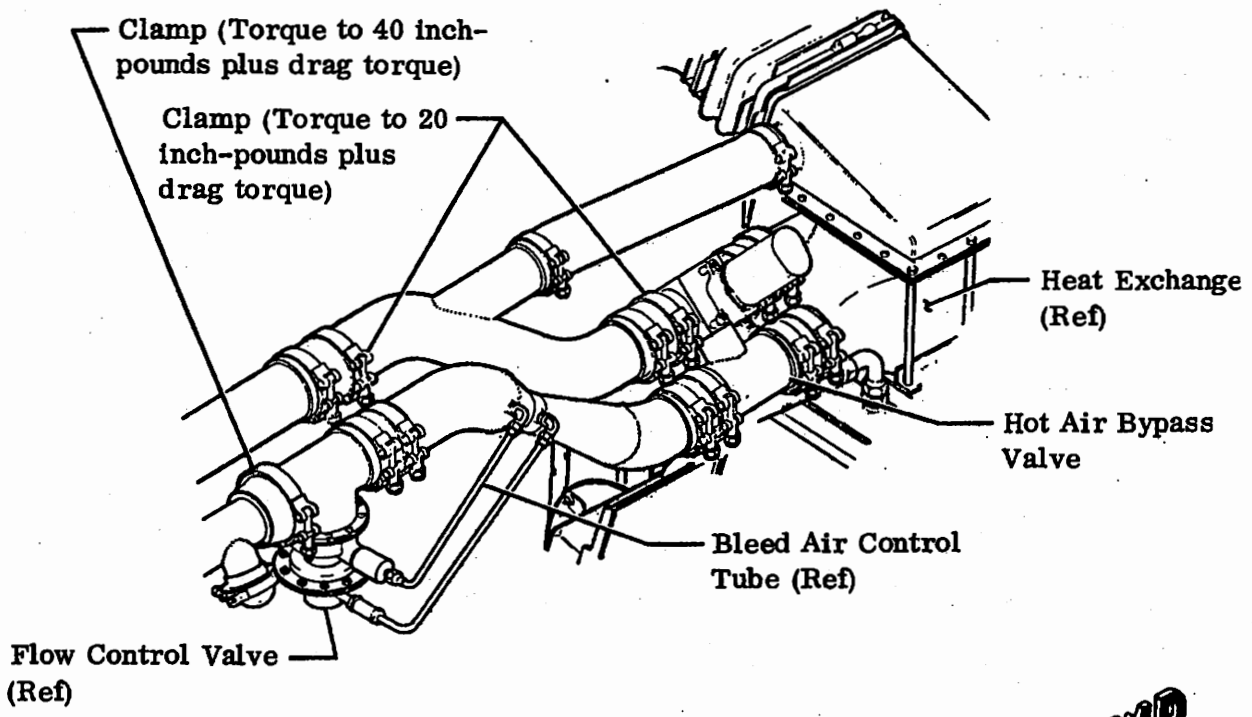
CAUTION: ON AIRCRAFT 25-227 AND SUBSEQUENT, WHEN REMOVING HOT AIR BYPASS VALVE, ASSURE THAT TEMPERATURE CONTROL PNEUMATIC LINE(S) AND FITTINGS ARE TIGHTLY CAPPED. DIRT AND OTHER CONTAMINANTS MAY AFFECT THE OPERATION OF THE TEMPERATURE CONTROL SYSTEM.

A. Remove Hot Air Bypass Valve (See figure 201.)
   (1) Remove electrical power from aircraft.
   (2) Lower tailcone access door.
   (3) Disconnect electrical connector(s) from hot air bypass valve.
   (4) On Aircraft 25-227 and Subsequent, disconnect servo pressure tube at hot air bypass valve. Cap exposed openings.
   (5) Loosen attaching parts securing valve to both bleed air and precooled air ducts.
   (6) Remove valve from ducts.

B. Install Hot Air Bypass Valve (See figure 201.)
   (1) Install hot air bypass valve in aircraft and secure with attaching parts.

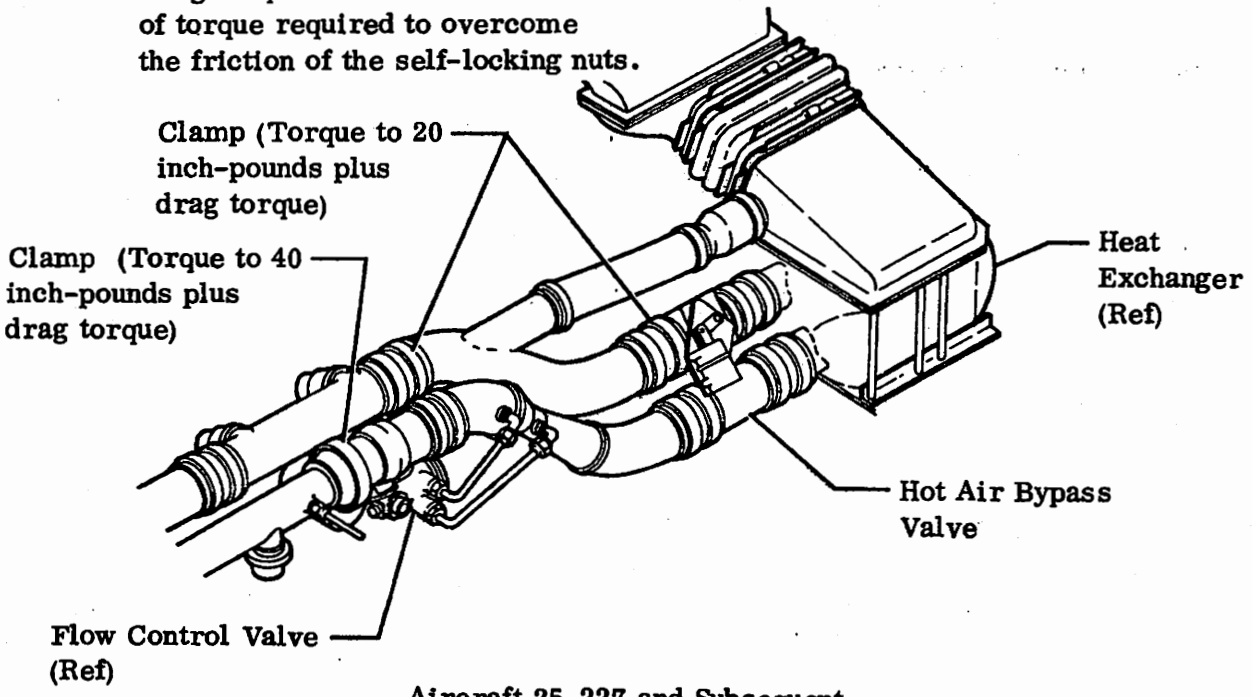
   NOTE: Torque clamps to 20 inch-pounds plus drag torque.

   (2) On Aircraft 25-227 and Subsequent, remove caps, and connect servo pressure tube to hot air bypass valve.
   (3) Connect electrical connector(s) to valve.
   (4) Raise and secure tailcone access door.
   (5) Restore electrical power to aircraft.



Aircraft 25-061, 25-070 thru 25-226

NOTE: Drag torque is the amount of torque required to overcome the friction of the self-locking nuts.



Aircraft 25-227 and Subsequent

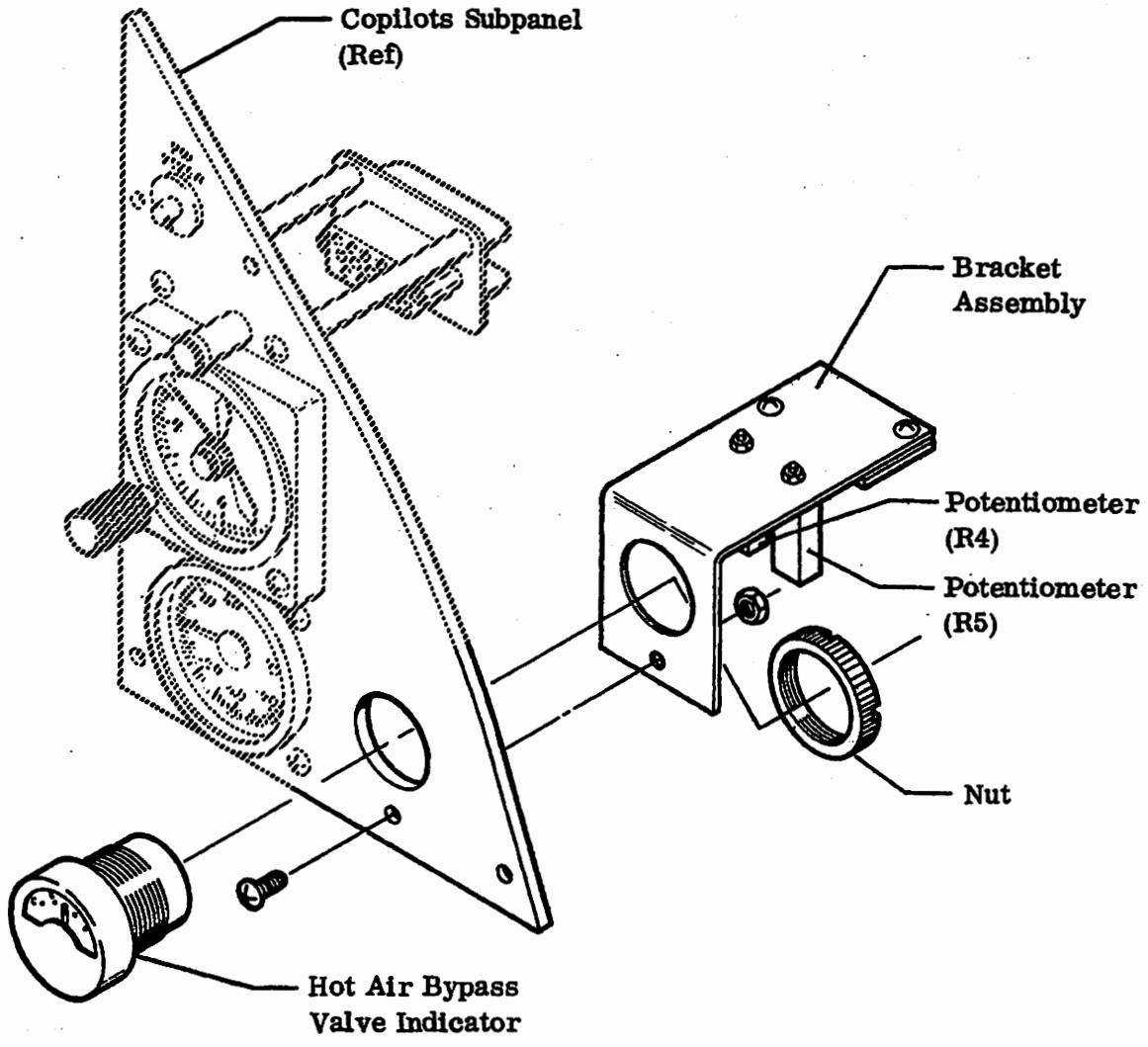
Hot Air Bypass Valve Installation
Figure 201

13-82C
13-100C

HOT AIR BYPASS VALVE INDICATOR - MAINTENANCE PRACTICES

1. Removal/Installation
   - A. Remove Hot Air Bypass Valve Indicator (See figure 201.)
     - (1) Remove attaching parts and copilot's subpanel sufficiently to gain access to subpanel electrical connector. Disconnect electrical connector and remove subpanel from aircraft.
     - (2) Disconnect and tag electrical wiring from hot air bypass valve indicator.
     - (3) Remove indicator attaching parts and indicator from subpanel.
   - B. Install Hot Air Bypass Valve Indicator (See figure 201.)
     - (1) Position hot air bypass valve indicator in copilot's subpanel and secure with attaching parts.
     - (2) Remove tags from wiring and connect to indicator.
     - (3) Connect subpanel electrical connector and reinstall subpanel.

2. Adjustment/Test
   - A. Adjust Hot Air Bypass Valve Indicator
     - (1) Set Battery Switch(es) on.
     - (2) Rotate cabin temperature selector knob counterclockwise to MAN.
     - (3) Hold HOT-COLD Switch to HOT until hot air bypass valve fully opens. Observe index pointer on bypass valve. Index pointer will move to HOT (fully open) in approximately 35 to 55 seconds.
     - (4) With bypass valve positioned as stated in step (3), adjust potentiometer R5 until pointer on indicator reads O.
     - (5) Hold HOT-COLD Switch to COLD until bypass valve fully closes, approximately 35 to 55 seconds. Index pointer on bypass valve will move to COLD (fully closed) position.
     - (6) With bypass valve positioned as stated in step (5), adjust potentiometer R4 until pointer on indicator reads C.
     - (7) Repeat steps (3) through (6) as required to obtain correct indicator adjustment.
     - (8) Set Battery Switch(es) off.



Typical Hot Air Bypass Valve Indicator Installation
Figure 201

13-102B

TEMPERATURE CONTROL SYSTEM FILTERS - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Filter Assembly (See figure 201.)

NOTE: One filter is located in the tee at frame 26 and LBL 3.0. The other filter is located in a tee between frames 13D and 13E and RBL 6.0 (top of cabin).

(1) Gain access to filter installation.
(2) Disconnect tubing from filter. Cap exposed tubing.
(3) Loosen and remove filter and O-ring from tee.
(4) Check filter for contamination and clean if necessary. Discard O-ring.

B. Install Filter Assembly (See figure 201.)

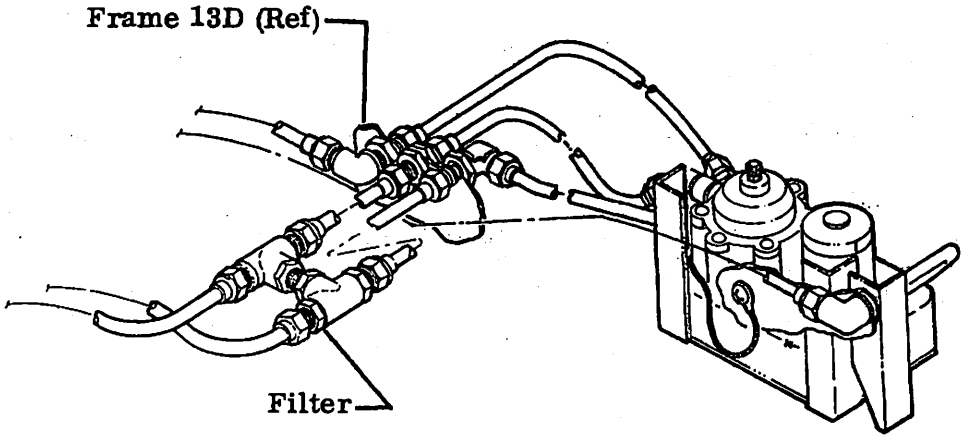
(1) Install new O-ring and filter in tee.
(2) Remove cap from tubing and connect tubing.
(3) Install previously removed equipment, if applicable.

2. Cleaning/Painting

A. Clean Filters

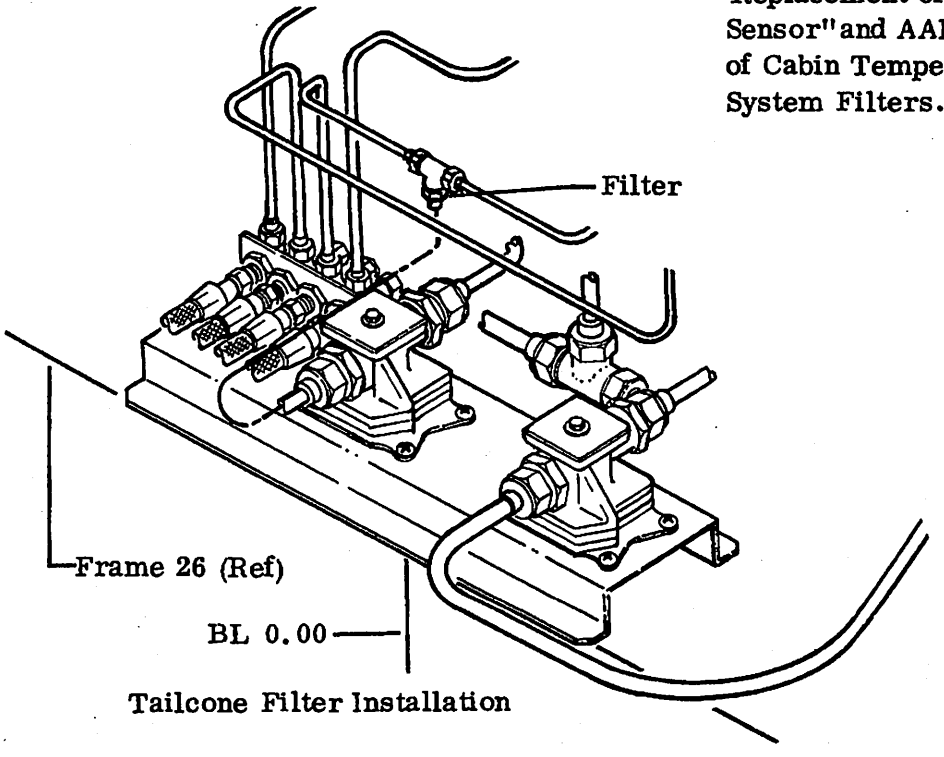
NOTE: The temperature control system filters are to be removed, inspected and cleaned in accordance with the current inspection interval specified in Chapter 5.

(1) Remove filter from aircraft.
(2) Clean filter with Methyl Ethyl Ketone (MEK).
(3) Air dry filter.
(4) Install filter in aircraft.



Cabin Filter Installation

SERIALS: 25-257 and Subsequent and 25-227 thru 25-256 Equipped with SSK 942 "Replacement of Cabin Temperature Sensor" and AAK 82-2 "Installation of Cabin Temperature Control System Filters."



Tailcone Filter Installation

Temperature Control System Filters
Figure 201